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Methods of Standardizing Vaccines*

By T. P. HASLAM, D. V. M., Sioux City, Iowa

ACCURATE standardization of bacterial vaccines is of importance both to the practitioner and the laboratory worker, because cooperation between the two is necessary in order to determine proper dosage, and dosage, to a considerable degree, must be determined by the clinical results reported by the practitioners. If there is a variation in the actual amount of antigenic substance contained in vaccines purported to be of the same strength, the task of determining dosage from clinical results is quite hopeless.

Dosage is a very important factor in administering bacterial vaccines. Wright has shown that too large doses depress the opsonic index, and he believes that too large doses are positively injurious to the patient.

A general discussion of the methods of enumerating bacteria is beyond the scope of this paper. It will be sufficient to say that the researches of Callison, Wilson, Vles, Glynn, Brown and others have pointed out many sources of error in the counting of bacteria. Wilson, Vles and Brown seem to favor abandoning attempts to standardize bacterial vaccines by count. Wilson would standardize them by weight, Brown and Bles by weight and opacity combined. Vles considers opacity the most constant characteristic of the vaccine emulsions. We have not as yet been able to get the apparatus or the proficiency to carry out the Vles method, but otherwise our own experience agrees with that of the investigators named, insofar as we have duplicated their work. Our experience confirms the opinions of Glynn, Brown and Smith that the plate method does not give a high enough count because so many bacteria are dead even in cultures twenty-four to thirty-six hours old. In one experiment Brown found as much as 98 per cent of a B. coli culture to be dead. Theobald Smith found that in bouillon cultures of B. suisepticus two or three days old, a large majority of the bacteria are dead. We have confirmed Glynn's observation that the distribution of the bacteria and red cells on the films in Wright's method is irregular and Glynn and Brown's observation that the staining fluid used in the Helber counting chamber may agglutinate the bacteria to such an extent as to render an accurate count of some suspensions impossible.

Weighing Method More Dependable

We most emphatically agree with Wilson, Brown and Vles that weighing of bacteria is a far more accurate and dependable method than counting. We consider the barium sulphate standard of Brown fairly accurate for those who do not have

*Presented at the 27th annual meeting of the Missouri Valley Veterinary Association, Omaha, July 12-14, 1920.

facilities for weighing bacteria and valuable for any worker as a means of checking his individual determinations, and especially valuable as a means of comparing his results with the results obtained by other workers. Brown's barium sulphate tubes are permanent and his tables covering seventeen species of bacteria enable one to translate the barium sulphate turbidity into milligrams of dry bacterial substance per cc.

It is not the intent of this paper to hold that bacteria cannot be accurately counted if all conditions be ideal, provided the suspension does not contain clumps and sufficient time is taken to carefully duplicate all counts. We spent a considerable amount of time in counting a certain suspension of B. suisepticus, making the counts by Wright's method, the Helber chamber and Breed's method. The solution was first freed from clumps and the bacteria counted by each method until concordant results were obtained. The counts by the three methods were in fair agreement. The amount of labor was, however, greater than one could afford to expend as a routine procedure, and we cannot see that the counted standard possessed any advantage whatever over a standard prepared by weight. Indeed, we feel much more certain of results when we prepare standards by the weighing method than we ever did of our counts.

In weighing, it is important to follow the special technic in growing and harvesting the bacteria as advised by Brown and to work with accurately calibrated weights and a good analytical balance, to make all weighings to constant weight and all determinations in duplicate. These are, however, the very things which every student in quantitative chemistry has drilled into him and we are confident that any chemist in any laboratory can closely duplicate the results obtained by some other chemists in another laboratory. The limit of error in weighing is about 1 per cent provided one starts with a charge of bacteria that will yield about ten milligrams of residue. If greater accuracy is desired the experimental error may be reduced by working with a larger sample. It is significant that clumps of course make no difference with weight and do not seriously influence the opacity of the suspensions.

If accurate standards are made up by weight at frequent intervals, routine determinations can be secured by matching the opacity of the unknown emulsion against that of the standard. In carrying out this comparison, we have found the method of Dryer and Gardner to be very helpful, inasmuch as the progressive dilutions used overcome differences in color and the method checks itself because of the fact that several different matches of turbidity are made and the different matches must agree between themselves. It is probable that the method of Vles would be very helpful in correlating weight and turbidity, and we are looking forward to employing it for this purpose, but at the present time we believe the simplest and most accurate method is to prepare weighed standards and by means of these, estimate the contents of the vaccine solution. For the benefit of those who do not have access to the original papers, I am appending the technic involved in weighing the bacteria, preparing the barium sulphate standards and comparing turbidity.

Conclusions

1. The standardization of bacteria by count is complicated by clumps in the emulsion to be counted and by numerous factors inherent in the method of count.
2. Standardization by weight is simply done and yields results accurate to 1 or 2 per cent if 10 milligram samples are used.
3. Brown's barium sulphate tubes are valuable for purposes of comparison between different workers at different places.
4. Dryer and Gardner's method of comparing turbidities is simple and satisfactory.
5. Vles' method of measuring absorption of light is somewhat difficult but probably very accurate.

Technic Used in Weighing Bacteria

According to Brown, the bacteria should be grown on agar slants which should be dried in an incubator at 37° for forty-eight hours, not only in order that the degree of humidity of the medium might be approximately the same in each case but also that the growth upon it might be easily removed without risk of carrying away the underlying agar. Such a dried agar slant is inoculated with a twenty-four hour culture of the organism and incubated at 37° for exactly twenty-four hours. The growth

on the surface is carefully removed by means of a platinum loop, care being taken to avoid any water of condensation which may be present at the lowest part of the tube. The growth is transferred from the platinum loop to an ordinary chemical weighing bottle where it is smeared on the inside surface. Of course the bottle is weighed before the growth is smeared on. It is advisable to simultaneously prepare two such bottles, putting one loopful in one bottle and the next in the other, and so on until the required amount is in each bottle. Both bottles are weighed and the weight of the moist growth recorded. One of the bottles is then placed in a vacuum desiccator over strong sulphuric acid and dried to constant weight, and the ratio between the weight of the moist and dry growths calculated. From this data the required amount of salt solution to be added to the other bottle in order to prepare an emulsion of the desired strength can be calculated. This method saves a great deal of labor in attempting to reemulsify cultures which have been dried. Formalin is added to the salt solution to hinder the autolysis of the bacteria.

Preparation of Barium Sulphate Opacity Tubes

A strong solution of barium chlorid is made and to this is added an excess of sulphuric acid. The mixture is boiled and the precipitate is poured onto a filter paper and washed until the filtrate is neutral to litmus paper.

The barium sulphate is then dried and thoroughly roasted. When cool, a portion is accurately weighed and placed in a perfectly clean mortar. The powder is finely ground and the requisite amount of a 1 per cent aqueous solution of sodium citrate is gradually added. From this 1 per cent suspension of barium sulphate dilutions are made up as follows. The first tube of the series contains an eight-fold suspension of 1 per cent barium sulphate; the next contains nine volumes of this and one volume of citrate and so on to the last tube which contains one volume of barium sulphate and nine volumes of citrate; thus the second tube in comparison to the first tube contains 90 per cent of barium sulphate; the third, 80 per cent, and so on down the line. Brown states that the tubes five years old have exactly the same opacity as freshly made suspensions of barium sulphate. In comparing the opacity of bacterial emulsions with the barium sulphate tubes the bacteria are put into tubes of the same kind and size as the standard tubes and are placed side by side in a good light upon some clearly printed books. The lighting must be equal in the two cases. The opacity of the two suspensions can then be readily compared by rolling the tubes from side to side and raising them slightly from the surface of the print.

Opacity comparisons. — Dryer and Gardner's method. Dwarf test-tubes of the same quality of glass and the same internal diameter are selected. Their surfaces must be clean and free from scratches. In these a series of dilutions similar to that described in the serum dilutions in the standardization of agglutinable cultures is prepared. The range of dilutions in the series is from 1 to 1 to 1 to 10, and is prepared by adding progressively diminishing quantities of culture to a sufficient volume of saline to equalize the volume in each case. Readings are made with artificial light on a black background. The originator preferred a frosted electric light bulb with a large green shade and some pieces of dull black board or paper placed on the table below the lamp and propped up behind it. A darkened room, though not absolutely necessary, adds considerably to the ease and accuracy of the readings. The lampshade is inclined so that the bulb is just hidden from the eye and the tubes to be compared are held up against the edge of the shade. Before reading, the outside of the tubes must be wiped with the moistened corner of a glass cloth and then polished with the dry part of the cloth. From one series a tube is chosen at random which is called the standard tube for the first reading. With this, the tubes of the other series are compared one after another until one is found which matches it in turbidity. It will be frequently found that there is no tube in the second series which gives an exact match, but there is one tube in the series which is a little more turbid, while the next lower is a little less. In this case the standard tube is recorded as lying between the two tubes of the other series. An example of the estimation of relative turbidities by the method will be quoted, although it is felt that the article should be read in its entirety by any one attempting its use.

Table I.

Estimation of relative turbidities of fluids A and B. A is a stock "standard" culture.

B is a fresh, undiluted, formalized bouillon culture of B. Typhosus.

Technic: graduated 2-0 cc. pipet and large tubes.

Readings Series A Tube	Series B Tube	Actual Quantities of Culture in the Matched Tubes A	B
2 matches	7	0.80 cc.	0.30 cc.
3-4 matches	9	0.53*	0.20
4-5 matches	10	0.46	0.17
2-3 matches	8	0.67	0.25
6-7 matches	11	0.35	0.13

Ratio: Quantity of A / Quantity of B	Deviation from Mean in Percentage
2-67	0.37
2-65	1.12
2-71	1.12
2-68	0.00
2-69	0.37
Mean 2-68	Mean error 0.60%

The average-figure given at the foot of the third column is an expression of the fact that 1.0 cc. of B gives the same turbidity reading as 2.68 cc. of A, when both are diluted to the same volume. If we now wish to dilute B to the same turbidity as A, all we have to do is to add to each 1.0 cc. of B 1.68 cc. of diluting fluid.

The readings vary, as a rule, about 3 per cent to 5 per cent on either side of the mean, and it is uncommon to find a reading with an error so great as 10 per cent. Such a close correspondence of the individual readings, each of which is in itself an experiment, is sufficient evidence of the trustworthiness of the method."

*This figure is obtained by interpolation. The reading 3-4 signifies "between tubes 3 and 4, but rather nearer 4." Now tube 3 contains 0.60 cc. and tube 4 contains 0.50 cc.—so we may take the figure to be a little less than 0.55, viz. 0.53.

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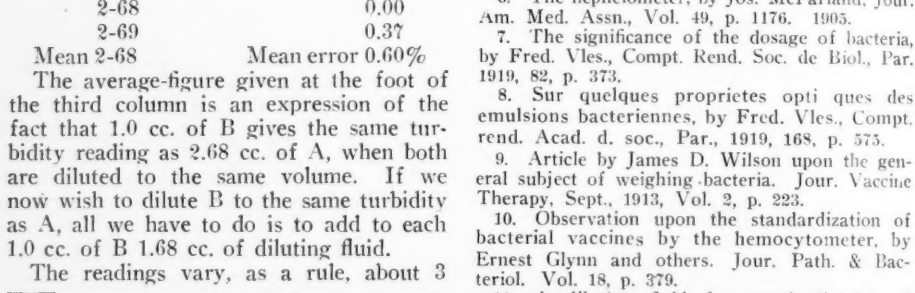


VETERINARY HOSPITAL OF HOLLISTER AND HAYS AT AVON, ILL.

Surgical Anesthesia*

By T. E. BEMIS, Ames, Iowa

THE use of anesthetics and narcotics has been increasing rapidly in veterinary practice during the past ten years. There are a number of factors, however, which are just now stimulating their more general use on all classes of animals. Due to the greater value of most species of animals, operations are being attempted now which before were not requested by the owners nor advised by the veterinarians. This is especially true of abdominal operations on all species, and for success in these, proper anesthesia as well as full attention to all details is necessary. Again, greater knowledge and skill on the part of the veterinarian and keener competition leads to the adoption of improved methods. These in time educate the public to demand the same of others and so the practice grows. In England public opinion is so strong that bills have been presented in Parliament since 1913, requiring the use of anesthetics in all major operations including castration. We may expect the same sentiment to be developed here in time.

The fact that animals are now shipped from all parts of one state or even from other states to the hospitals in connection with our colleges or large city practices where there are a number of assistants, indicates that for the few we are approaching the practice in human medicine, but as the majority of veterinarians do their work alone they must depend to a greater extent upon narcotics and local anesthetics, which once administered require no further attention.

In selecting an anesthetic, the operator must always consider the age, species and general condition of the animal, particularly with regard to the condition of the heart and lungs and the opportunity for preparation of the digestive tract before operating. I shall not discuss the entire list of possible agents which may be used for anesthesia, but rather those which are proving to be the most practical at the present time.

*Presented at the 27th annual meeting of the Missouri Valley Veterinary Medical Association, Omaha, July, 12-14, 1920.

Chloroform

Chloroform is the standard general anesthetic for the horse, and may be used with special care in the ox, sheep, and dog. The results of its use in the pig are not encouraging. Chloroform for anesthesia should always be of standard preparation and should be kept in small ¼-pound bottles in a cool, dark place. A bottle once opened should be used immediately or discarded for anesthesia. Animals to be chloroformed should always be examined carefully as to pulse, respiration and temperature, and the digestive tract should be emptied by dieting and mild laxatives if the operation is to be serious and prolonged.

A simple and practical method of administration to large animals is as follows: Cast the animal and secure with the least possible restriction of the movement of the thorax and abdomen. Plug the lower nostril with cotton, cover the upper nostril with four thicknesses of ordinary toweling wrapped tightly around the mouth and nostrils and tucked under the nose band. If the animal is to be cast upon the ground lying on its right side, the anesthetist should sit on the ground in the angle formed by the head and neck, with his back toward the neck of the animal, his right knee flexed, forming a pillow for the animal's nose, and his left leg extended and foot planted in the ground, forming a brace against the struggling of the animal during the stage of excitement. The character of the respirations may be watched over the left shoulder and the eye may be watched under the right arm. The left hand holds the ala of the upper nostril dilated and the right holds the chloroform bottle. The end of the nose should be lower than the poll, and in cattle and sheep the anterior part of the body should be lower than the posterior to prevent regurgitation. Use the drop method, beginning slowly and regularly at the very beginning of each inspiration. Later push the administration so that the anesthetic stage will be reached in from ten to

twelve minutes and by the use of two and one-half to three ounces of chloroform.

The anesthetic stage is indicated by deep regular breathing, slow full pulse, relaxation of the muscles and loss of corneal reflexes. Operations should not be started before this stage is reached. The amount of chloroform given may then be decreased gradually, the intervals of administration lengthened and more air admitted, so as to carry the animal just within the anesthetic stage on the least amount possible. This is particularly important in long operations, as it is not only the rapidity of administration but the maximum amount of chloroform that gives trouble at the time or during the period of recovery. I never like to administer over eight ounces of chloroform and anything over twelve to sixteen ounces is quite apt to be followed by bad results.

The danger signs during anesthesia are: continued excitement, trembling of the muscles, dilation of the pupil, small rapid and irregular pulse, and shallow, irregular, thoracic breathing. Extreme care must be taken not to push an animal over the anesthetic stage into the toxic stage by too rapid administration, and to mistake the excitement and dilation of the pupil for the stage of excitement which precedes anesthesia. In poisoning, the respiration is usually first to fail, though with chloroform the heart is sometimes affected first. In case of poisoning, cease administration immediately, free the nostrils and mouth of obstructions, pull out the tongue and allow plenty of fresh air. If respiratory failure occurs, start artificial respiration by methodical compressions of the thorax, about twenty per minute. Dilate the anus, administer oil of camphor, caffein or atropin subcutaneously. Do not use strychnin.

Chloroform is a good anesthetic for dogs if administered by an expert anesthetist who can give his whole attention to it, but as neither of these apply to the average practitioner, we do not recommend its use.

Ether

Ether is a good anesthetic for the dog, cat, and pig, but is especially useful for the cat, as it is practically the only general anesthetic which can be administered to the cat with safety. If used on the dog and pig, it should be administered by the drop method through a cone placed over the nose and covered with several thicknesses of gauze.

For the cat, it is most convenient to place the animal under a bell jar with a sponge containing two to four drams of ether until anesthesia is produced, then continue with the drop method, being very careful not to push the administration too fast. We comonly say a cat has nine lives, but it is surprising and disappointing to see how easily they can die when one is trying to keep them alive.

Morphine Sulphate

For the dog, morphine sulphate is the anesthetic par excellence. Prepare the animal by reduced diet, giving a laxative the day before. Morphine should be administered subcutaneously in the thin skin of the axillary region or thigh in doses of one-fourth to three or four grains, depending upon the size and breed of the dog, about twenty to thirty minutes before the time of operation. Except in young dogs of the toy breeds, there is very little danger connected with its use, and the most common mistake is to give too little rather than too much. For the Boston terrier, and dogs of that size, 1 to 1.5 grains; for the Bull terrier and collie, 2 to 3 grains, and for the larger breeds 3 to 4 grains are advised. If anesthesia is not satisfactory with morphin alone, a few inhalations of ether or chloroform will complete the anesthesia and the morphin will then hold for several hours.

Chloral Hydrate

For pigs, chloral hydrate is the safest and most practical anesthetic. One dram of chloral should be masked in 1 ounce of water containing 1 dram of acacia. Of this preparation, 1½ to 2 ounces for each 50 pounds weight should be administered by high rectal injection and retained in place by holding a sponge over the anus or by elevating the hind quarters. This should be done 20 to 30 minutes before the operation, and the animal left quiet until under. The usual fault is in using too little rather than too

much. The effect will last for several hours following the operation.

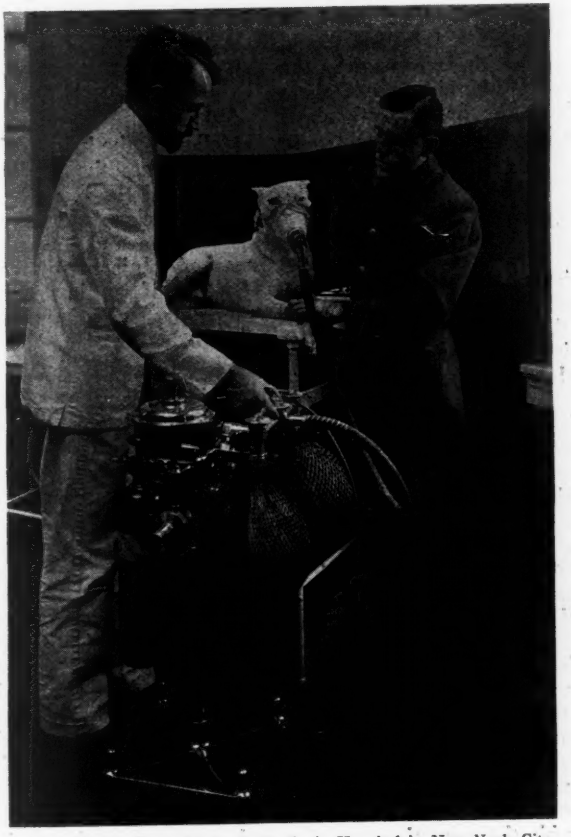
Chloral is also useful as a narcotic in large animals, administered either per orum or per rectum, well diluted in warm water or masked with acacia emulsion as above. One to two ounces should be administered one-half to one hour before operation. Its use intravenously or intraperitoneally is not advised except for experimental purposes. When so administered, two to three ounces result in profound anesthesia which lasts for three or four hours, but if even a small amount escapes under the skin, a severe slough or phlebitis results, which is disagreeable if not serious in nature.

Cannabis Indica

Cannabis Indica is used in vicious horses as an anodyne to quiet them or to give partial control in operations which can best be performed in the standing position, as oophorectomy in mares. For this purpose, one to two drams are injected intravenously about 20 to 30 minutes before operating.

Local Anesthesia

I wish especially to urge the more general use of local anesthetics. Either when used alone or in combination with chloral or morphin, according to the species, local anesthesia serves in a long list of operations where anesthesia is desired but where general anesthesia is impractical. About their only limitations are in cases where the operative area is too large, as in large hernias; where the structures cannot be injected as in cryptorchidy or other abdominal operations; or where the operation cannot be definitely planned before beginning,



Anesthetising a dog in the S. P. C. A. Hospital in New York City

as in malignant tumors. In any case where struggling on the part of the animal is a serious handicap, general anesthesia must be used.

The method of injection is very important in using local anesthetics, and should vary with the tissues to be injected.

1. If the skin alone is to be anesthetized, the solution may be injected into the deeper layers of the skin (endermic anesthetization). This requires only a drop of the fluid at each point of injection, which will spread itself equally in all directions from the puncture. The second injection should be in the edge of the circle formed by the first, and so on. With this method there is pain only from the first injection and the incision can be made immediately after the injection.

2. The nerves may be anesthetized by injecting subcutaneously (subdermic anesthetization). This is the commonest method used in veterinary practice. Large areas may be infiltrated with one-half per cent solution and thus secure results without exceeding the limit of safety.

3. The entire nerve supply to a part may be blocked by perineural injection in the vicinity of the nerve. This method is used in dental nerves and the nerves of the lower extremities. Solutions of from two to four per cent strength should be used and ten minutes allowed to elapse before operating. One to two mils is sufficient for each nerve.

By the use of these methods we have been able to satisfactorily perform, aside from the usual minor operations, extraction or repulsion of teeth, neurectomies of the lower limbs, painful foot operations, fistula of the withers when not too much indurated, non-malignant tumors and cysts, operations upon the eye, ear, tail, penis and rectum; in fact, in almost any operation where the part can be well injected and where struggling due to confinement does not interfere with the operation.

Injection of Dental Nerves

For the injection of the superior dental nerve, choose a point opposite the lateral canthus of the eye and just ventral to the facial crest at that point; raise the transverse facial vein by pressure, and insert a long but small caliber needle between the vein and the crest at right angles to the plane of the masseter muscle. Allow the needle to follow along the posterior surface of the maxillary tuberosity into the maxillary hiatus, across the floor of which the nerve is exposed for a length of one to two inches before it enters the dental canal. In the depth of the hiatus inject two mils of a four per cent solution of cocain and another mil as the needle is withdrawn. Wait ten minutes before operating.

Injection of the inferior dental nerve is much more difficult. A needle must be passed as near to the point at which the nerve enters the mandible as possible. This foramen lies opposite the intersection of an imaginary line drawn backward prolonging the line of the table surface of the mandibular cheek teeth and a line dropped perpendicular to it from the lateral canthus of the eye. This point should be marked by clipping the hair. After thorough preparation, pass the needle along the medial surface of the mandible from a point 1.5 to two inches below the temporomaxillary articulation and toward the point already marked. Inject two mils of a four per cent solution of cocain and distribute two mils along the path of the needle as it is withdrawn.

Principal Anesthetic Drugs

Of the large number of drugs which may be used, it is necessary to be familiar with the use of only three or four.

1. Cocain is the standard and is to be preferred for use in the horse whenever it is not necessary to inject over 5 to 6 grains, which is seldom. A two per cent solution may be taken as a standard for injection of the skin and subcutis for all ordinary purposes. A four per cent solution is advisable for application to mucous surfaces, especially of the eye or for the blocking of large nerve-trunks by the perineural method. For the infiltration of larger areas where there are no definite or large nerves to be controlled, a one-half per cent solution is sufficient.

2. Stovain and procain may be used in the same strength solution as cocain on all animals. They are less toxic, and while they are efficient, they seem to lack somewhat in promptness and certainty in comparison with cocain, especially when used upon the eye.

3. Quinin and urea hydrochlorid. This drug is so distinct in its action from the other local anesthetics that it deserves mention. It is non-toxic, can be sterilized by boiling, and its action is prolonged for hours or days. It is, however, slow in its

action and must be used in dilute solution, one-half per cent, to prevent swellings and sloughs. It is used. therefore, chiefly for infiltration of large areas, such as the base of large tumors, mammary glands, etc., and where a prolonged action is desirable.

SUMMARY

Animal	General Anesthesia	Partial Anesthesia	Local Anesthesia
Horse	Chloroform, 1 to 12 ounces	Chloral, 1 to 2 oz. per orum or per rectum Cannabis, 4 to 8 mils per vein	Cocain, ½ to 4% solution and not to exceed 6 grains of the drug Stovain and Procain, same strength solution, ⅓ less toxic than cocain Quinin and Urea, ½%. Non-toxic.
Ox	Chloroform, 4 to 12 ounces	Chloral, 2 to 4 oz. per orum or per rectum	Same as for horse
Pig	Chloral, per rectum, 1½ to 2 drams per 50 pounds weight.	.....	Same as above but not to exceed 2 to 4 grains of cocain
Dog	Morphin, 1 to 4 grains subcutaneously.	.....	Cocain not to exceed 1/10 grain per pound body weight Stovain or procain in larger amounts
Cat	Ether, 1 to 6 drams	.....	Cocain, ½ grain. Stovain or procain, 1 to 2 grains

Commercial Feeds*

By E. F. FERRIN, Associate Professor, Kansas State Agricultural College

THE term "commercial feeds" covers a wide variety of products. They are frequently the by-products of some manufacturing process and represent the residues left from the making of specified commodities. Thus we have linseed and cottonseed meals resulting respectively from the extraction of linseed and cottonseed oils. Tankage or meat meal is the most common packing house by-product; corn gluten feed, hominy feed, and corn germ meal the residues of corn starch, hominy and corn oil production. Feeding molasses either of the cane or beet varieties is left after sugar is made. Wheat by-products are bran, shorts, and screenings. Commercial milk feeds are among the more recent additions to the family and appear as semi-solid buttermilk, a pasty or salve like substance, and powdered skim milk or buttermilk. Many other straight by-product feeds might be mentioned.

Another rapidly growing branch of the commercial feed industry includes those products which are made up of a mixture of several ingredients, some of which are usually certain by-products as listed above. This business is often spoken of as the feed manufacturing industry but the term is by no means limited now-a-days to the producers of these kinds of feeds. Let us have some examples to make the point clear. Alfalfa molasses feeds are marketed by concerns which do not produce the ingredients used in the mixture, ground alfalfa hay and either cane or beet molasses with sometimes other materials. Poultry feed mixtures are usually put out by firms buying all and producing none of the materials used.

For convenience in handling, commercial feeds are commonly sold in one hundred pound bags except those high enough in moisture content to require barreling. Trade or brand names are given to different products and extensive advertising frequently employed.

Stock tonics and condimental feeds fall in a different class than do commercial feeds. These are designed to stimulate the appetite and to act as a conditioner. Since they are not really feeds and supposed to be medicinal in character their sale is subject to different provisions than the sale of commercial feeds.

*Presented at 27th annual meeting of the Missouri Valley Veterinary Association, Omaha, July 12-14, 1920.

Laws Governing Commercial Feeds

Most states and the federal government have laws regulating the sale of commercial feeds. These laws are designed to protect the honest manufacturer and dealer as well as the purchaser. As in all business, some parties attempt to increase their profits by dishonest methods but it is a safe statement that the great majority of feed concerns are attempting to put out an honest product to sell upon its merits.

These feeding stuffs laws vary but their provisions in general specify that upon the container, or a tag attached to it, must be stated the net weight of the feed, the maximum percentage of crude fiber and the minimum percentages of crude protein and fat. Adulterants if used must usually also be stated.

Do these requirements assist people in distinguishing between worthless and desirable feeds?

In a measure, yes, and the laws have been of great benefit to the buyer of feeds and the conscientious manufacturer. Practices such as the addition of sand, short weight, and misstatement of the analysis of the feed have been nearly eliminated. Short weighing was more or less common prior to the enactment of feeding stuffs laws.

A good beginning has been made in the regulation of the sale of mixed feeds. If the purchaser will make use of the information available he can form a reasonably accurate estimate of the value of a feed. First of all should be considered the fiber content.

If there is a high percentage of crude fiber, say twelve per cent or more, bulky materials have been used in the mixture to a considerable extent. This bulk may come from oat hulls, screenings, corn bran, or other low grade feeding stuff which is of very little value to the animal. Usually feed mixtures low in fiber are made up of more desirable ingredients than those combinations of materials having a high fiber content.

Should Be High In Protein

If the feeding stuff is bought to supplement farm grown feeds it should be high in protein. Usually carbohydrates, the compounds which furnish heat and energy and build up body fat, can be grown on the farm cheaper than they can be purchased. Therefore it is important to buy a feed which will supply the deficiencies of home grown material. Fifteen per cent or more of protein is needed to make a feeding stuff suitable for balancing other feeds high in carbohydrates and fat.

Most all feed mixtures have a fairly high percentage of carbohydrates. These are the cheapest of all nutrient compounds and consequently the buyer gets them in largest amounts. But it is usually better business to depend upon hays and grains for this class of compounds than upon mixed commercial feeds.

No rule can be given which will enable a prospective purchaser to look at a feed and tell whether it is worth the price asked for it. No blanket recommendation or condemnation can be made of commercial feeds. In purchasing avoid high fiber feeds because these usually contain inferior materials. Buy for a definite purpose. The same feed cannot be equally suitable for hogs, dairy cattle and beef cattle. Swine cannot use over five per cent of fiber in the ration to advantage while cattle can easily handle twice that much bulk.

If the ingredients of the mixed feed are stated upon the package it helps the buyer to avoid combinations of poor materials. These may be wheat screenings, oat hulls, peat, moss, corn bran, rice hulls or similar inferior stuff. Being finely ground it is not possible to separate out the particles from the mixture and identify them. The analysis only indirectly shows the presence of these adulterants they may escape detection if the feed constituents are not named.

Caution Necessary in Buying Mixed Feeds

How can we decide between the good and the worthless feeds? Use caution in buying mixed feeds; choose those put out by reputable firms. Compare guarantees and ingredients if such are listed. Buy in small quantities until some experience with the feed has been gained. Extensive and continued advertising of a certain brand of feed is not conclusive evidence that it is a profitable feed to buy. True, it must be reasonably good or there would be no justification for the expenditure of so much money in getting it before the public. A much better recommendation for a feed than widespread

advertising is the experience of feeders in your own locality. Ask the dealer to whom he has sold the feed he tries to sell you. Hunt up these purchasers and get their opinion of the value of the feed. They will hardly be prejudiced and usually will give valuable information.

Can a feeder better afford to buy mixed commercial feeds than straight grain and hay?

Some times. Take for example the feeding of city horses of which there are about three million in the United States. High class mixed feed can often be more economically used for feeding these horses than grain and hay, as all feeds must be purchased. But on the farm where some of the feeds are home grown it is very doubtful if the purchase of commercial feeds for horses is advisable .

Suppose a feeder is giving little attention to the ration his stock receives. That he is feeding either a high protein or a rich carbonaceous ration. Results with this unbalanced feed will not be the best. Substitute for this careless combination of feeds a good mixed commercial feed and the stock will probably thrive better and the cost may be reduced.

Buy mixed commercial feeds only after investigation; never upon the salesman's recommendation. Use judgment to distinguish the worthless from the meritorious feeds. In case of doubt let some one else experiment with the feed. You cannot afford to do it.

The Eradication of Bovine Tuberculosis*

By CLIFFORD ACKLEY, D. V. M., Olympia, Wash., State Veterinary Inspector

TO the older veterinarians in the United States the progress in eradicating bovine tuberculosis has often seemed distressingly slow and somewhat discouraging. Although the movement to stamp this disease out of this country began in 1883—38 years ago—we do not seem very much nearer the goal than when the work was started. A more careful review of this past work is, however, encouraging, and it now seems almost certain that the disease will be practically eliminated within the next few years. I say practically eliminated, because it is doubtful if any person now living will see the disease entirely stamped out, as sporadic outbreaks will doubtless continue to occur for many years to come.

Tuberculosis is the oldest recognized disease of which the world has any history, and when we consider how many centuries this disease has been known, and how much effort has been put forth in the past to combat it, we can but feel encouraged at the result of the work of the present generation.

Among the early efforts to combat the progress of tuberculosis Lydtin refers to the law of Moses, under which the pining (dürre Schwinden) animal could not be eaten; to the Mischna, which expressly condemns carcasses, the lungs of which cannot be inflated, or have attached growths, to the continuance of this law among Christians until the third century; to the Roman masters of markets who saw that bad and corrupt meats were thrown into the Tiber; to the church law published in the tenth century against the consumption of diseased meat, and to the ancient laws of Italy, France, Spain and Germany against the sale of diseased meat. For the sale of tubercular meat a French butcher was in 1716 sentenced to nine years exile, a fine of five thousand pounds, and permanent prohibition from again engaging in the butcher business. (I might add, that a few such sentences could be given in the United States in 1920, with undoubtedly good results.)

The real, or effective efforts to eradicate tuberculosis did not begin until 1884, in which year Koch discovered the bacillus of tuberculosis: in fact until the discovery of tuberculin by Koch in 1890, little was accomplished in checking the disease.

In a report of "Contagious Diseases of Domesticated Animals," comprising a report of the investigations of the United States Department of Agriculture during the years 1883 and 1884, a considerable portion of the book is given to the discussion of human, bovine and avian tuberculosis. On page 168 of this report it is stated that "29 per cent of the adult males dying

*Paper read before the Oregon-Washington Veterinary Medical Association, Aug. 6, 1920.

in New York City are tuberculous, and that in certain of the herds that supply that city with milk, 20, 30 and even 50 per cent are affected with the same disease. In the country districts of New York can be shown large herds with 90 per cent the subjects of tuberculosis."

Tuberculin as first introduced by Koch was designed for curative purposes. With its first use, however, it was discovered that the initial dose was followed by an increase of temperature on the part of a tubercular patient, and following this discovery, its value as a diagnostic agent was quickly seized upon. As a curative agent it was practically a failure, but to the use that it is now put the world will owe the eventual stamping out of this dread disease.

The first tuberculin testing in this country was conducted by the United States Department of Agriculture in 1891. Work was begun by the government of Denmark in 1893, and by 1898 tuberculin testing was being conducted by practically every civilized country in the world.

Work Impeded by Lack of Cooperation

The work of tuberculosis eradication in the past has been impeded by a lack of cooperation between the Federal Department of Agriculture and the various state officials; by a lack of concerted action on the part of the veterinary profession; by a lack of sufficient funds provided to finance the work; by ignorance and prejudice on the part of many cattle owners, and by indifference to the menace of the disease on the part of the public in general. One by one, these barriers are being broken down. Public sentiment is now strongly in favor of tuberculosis eradication. Everywhere the veterinary inspector goes he hears the cry: "Why is not tuberculin testing made compulsory?"

Cooperation between the State and Federal Departments of Agriculture is now being carried successfully on in 43 states. An average of about 60,000 cattle are being tested or retested, monthly in the United States by government and state inspectors. While the number tested by private practitioners is not available, it would probably bring the total monthly average to about 75,000. At present the average number of reactors being uncovered monthly in the United States is about four per cent of the number tested. The number of reactors being found is constantly showing a decrease, although so far, slowly. For instance in my own state, Washington, there were tested in 1918, 48,852 head of cattle, of which 1,896 reacted, a percentage of 3.88 per cent tuberculous. In 1919 we tested 49,295, finding 1,753, or 3.42 per cent, diseased. As nearly as I am able to estimate by the figures which I have available, this percentage of decrease is about the general average for the entire country.

Probably the most discouraging feature of these reports is the small number tested in comparison with the number of cattle in existence. For instance, while the State of Washington tested in 1919 less than 50,000 head of cattle, there are in the state about 280,000 head. A large percentage of these are range animals, of the beef type. These range animals in the past have been fairly free from tuberculosis, but during late years the disease has been introduced by the placing of pure-bred bulls, many of which introduced the disease. Testing of range animals to a greater extent will be necessary before tuberculosis can be entirely eliminated.

In the United States there was in 1919, as nearly as I can estimate, about 750,000 animals tested for tuberculosis. This number includes many retests, but does not include many which were tested by practicing veterinarians, and which in many instances were not reported. As the cattle population of the United States is close to 65,000,000 head, we have only tested a comparatively small percentage. Of course this major number includes many calves, as well as nearly 40,000,000 beef cattle. The figures given above, while not accurate, are approximate, and give some idea of the vast amount of work yet to be accomplished.

Paramount Needs

In the work of tuberculosis eradication, the following are among the most paramount needs:

Larger Appropriations.—During the past year there has been regularly employed, in tuberculosis eradication, by the United States Bureau of Animal Industry and the 43 states co-operating, an average of about 250 veterinarians. At least ten times this number of men could and should be employed on this work. Allowing each one an average salary of only $2,000 a year, which is as little as can be paid upon this work if competent men are to be held, this

would mean an annual pay roll of about $5,000,000. About $3,000,000 would be needed for personal expenses for these men, including transportation. If indemnity is to be paid upon the reactors found—and there certainly should be—about $5,000,000 should be set aside yearly for this purpose. Incidental expenses, euch as tuberculin, printing, etc., will bring the total amount up to $20,000,000 annually. This is the least amount that could be considered in order to properly undertake this work, and it is not a vast sum, either, when it is considered that the disease is at the present time costing the country at least twice that amount.

Indeed, until the public, and our legislators especially, wake up to the urgent necessity of this work, we as a veterinary profession can not hope to do much more than hold the disease in check. It is improbable, however, until the country has to a degree recovered the great losses incurred by the war, that we will be able to secure a proper appropriation to carry on this work.

More Efficient Legislation.—Next in importance to a larger appropriation is the need of more efficient legislation. At the present time, if the owner of a herd of cattle discovers that the disease exists in his herd, there are few states having laws which will prevent his disposing of these diseased cattle, either at private sale, or by offering the entire herd at auction. These cattle, when sold, may distribute the disease over a vast area, undoing the work of tuberculosis eradication that has been carried on in the district into which these diseased cattle are distributed. Oregon has a law requiring the tuberculin testing of all cattle offered for sale at public auction. This law should be incorporated upon the books of every state engaged in endeavoring to eradicate tuberculosis. In fact, the law should be made to not only cover cattle sold at public auction, but to also include cattle offered at private sale. The testing of such cattle will in most instances be done by practicing veterinarians. It is testing that would not be done otherwise without the enforcement of a compulsory testing law, and animals thus offered for sale, if proved tuberculous, should be killed without the payment of indemnity, in my opinion.

The Bang System.—There may be remote instances where the Bang system of placing tubercular animals in quarantine has worked out to good advantage, but this system has been so abused in the past, and the advantages and gains have been so remote, when the vast amount of damage has been considered, that in my personal opinion this practice should be entirely discontinued.

With the Bang system as an excuse, many careless and inefficient veterinarians have permitted even single grade animals which were tuberculous to be retained upon the farm "in quarantine," often in the possession of ignorant or unscrupulous owners. Even when the owner is partially educated to the danger, and endeavors to carry out the provisions of the quarantine rules, he will eventually become negligent and careless. On the other hand, every experienced veterinary inspector knows that in nine out of ten cases it would require the constant service of two good inspectors, armed with sawed-off shot guns, to keep the owner from violating the terms of the quarantine and eventually allowing the disease to spread. Taken as a whole, the Bang system has caused and is still causing twice the loss that it has saved, and the disease can never be wholly eradicated until the system is a thing of the past.

The Intradermal Test.—The intradermal test has done more in the past few years to promote tuberculin testing than any other one factor. The speed with which the work can be carried on, the small inconvenience to the cattle owner as compared with the old subcutaneous method, are its two most predominating features. Now that the United States Department of Agriculture has tardily accepted this test, we can expect to have more work accomplished with the same force of inspectors.

Public sentiment is fast awakening to the dangers of tuberculosis, and to a realization of the vast loss, both financially and in human life, that the disease is costing the nation. More active work in tuberculosis eradication will undoubtedly be taken up in the near future, and it behooves us, as a veterinary profession, to put forth greater efforts in the study of the disease, to find the best methods to accomplish this eradication, if we are to continue to lead this great movement.

Control of Municipal Milk Supplies*

By H. A. HARDING and M. J. PRUCHA
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SO many suggestions have been received through friendly discussions of this subject that it is practically impossible to present a paper without unwittingly appropriating the ideas of others while at the same time it might be embarrassing to attribute any formal expression to any particular friend who might in turn fail to recognize it or be loath to approve it exactly in the form it might be stated. Accordingly the situation will be best met if the reader will kindly give credit for anything which may seem good to friendly advisers while holding the authors responsible for anything with which he does not find himself in agreement.

There are many and complex problems even in the field of milk control. These arise partly because of the nature of milk problems and partly because of the varying natural and developmental conditions which exist in the wide stretch of territory included within our country. In the northern portions the prevailing temperatures are arctic and ice is almost too abundant while in the southern portions tropical temperatures rule and natural ice is unknown. Not only should these extreme conditions be considered but it is well to remember that the larger part of our most quoted milk regulations have developed in a series of cities lying in a narrow zone where natural ice in winter is the normal experience and the summer temperatures while high for a time do not unduly increase the temperature of the water available for cooling the milk.

The developmental conditions are as varied as the climatic ones. In some of our cities efficient, constructive work with milk supplies has been in progress for more than a generation, exerting an influence upon both the conditions under which milk is produced and handled and upon the public appreciation of good milk. On the other hand in many of the other cities little or nothing in the way of milk control has been seriously undertaken. Moreover the quality of the milk supply of the rural third of our population has received little consideration. When careful study is given to this latter phase of the question it will undoubtedly be found that like the water supply the rural milk supply taken as a whole is not equal in quality to that of the larger cities and is scarcely comparable with that of the smaller ones.

In view of the fact that the milk supplies of at least three-fourths of our cities are at present imperfectly controlled it seems best to confine these suggestions to the more universal problems of milk control. It is frequently noted that a municipality in beginning the improvement of its milk supply often copies the regulations which have been developed in another city as the result of a long evolution. Such attempts to quickly attain perfection are rarely successful. There are certain qualities to be striven for in every milk supply. In any given region the order and method of attaining them will have much in common. The detailed steps by which they may be attained in any community depend upon the local conditions and personalities involved.

Official oversight of anything which comes into intimate touch with all the people can not proceed far in advance of public sentiment. Accordingly attention must be given to the public mind regarding milk and the possibility of so directing milk improvement as to increase intelligent interest in the subject. Progress is the logical result of the best elements in the situation working together. The tendency of the press to announce milk crusades, suspicion on the part of the milk men that the health officials are not fair minded and the feeling on the part of the consumers that the milk is hopelessly bad are usually all to be met and overcome.

If the more intelligent members of the community are asked to express in non-

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technical language their ideas regarding the characteristics of a good milk supply they will insist that it be such that they can use it without danger of disease, that it be fairly rich in cream, that it carry nothing offensive to the esthetic sense and that it remain sweet for a reasonable time after delivery. In short the consuming public desires a milk which is safe, rich, clean and sweet. Any system of control which they understand is striving to provide them with such an article tends to enlist their support.

Most workers in milk improvement will insist that these are precisely the objects which they have had constantly in view. However, so long as their private and public statements are directed primarily toward minimum legal limits of composition, barn scores and bacterial counts, it is a fair question as to how much the public is to be blamed for not appreciating the connection between such things and the characteristics of a milk supply in which the public is interested.

Hoping thereby to make more evident the relation between the kind of milk which the public desires and the regulations which will assist in its production, milk regulations will be discussed under the headings of milk which is safe, rich, clean and sweet.

Safe Milk

The safety of the milk supply can be guaranteed either by a supervision of the health of the cows and people concerned in its production or by treatment of the milk itself.

There is a natural and widespread feeling that it is better to protect milk from infection than to free it from infection. Experience with "certified" milk production has shown that a careful, periodic examination of the cows and people supplemented by constant oversight will reduce the danger of contamination to low limits. On the other hand the expense incident to such a careful, frequent examination and oversight is so great that no large city has yet provided adequate funds for such supervision of its milk supply. When properly done such a supervision entails an economic burden of some cents per quart.

The other method of rendering the milk safe from the danger of carrying disease germs is positive pasteurization followed by protection from subsequent contamination.

Positive pasteurization is the process by which every portion of the milk so treated is heated to a temperature of 140° to 145° F., held thereat for thirty minutes, and then cooled to a temperature of 50° F. or lower, the degree and time of heating, holding and cooling being invariably recorded by tested automatic device, the records from which are dated daily on removal from the device, and are checked at regular intervals by health authorities.

Protection from subsequent contamination means filling the milk, immediately after pasteurization and at the place thereof, in reasonably sanitary surroundings (having special reference to pure water supply, complete and safe disposal of human excreta, and control of fly prevalence), by healthy handlers, into clean and sufficiently steamed containers (205° F. for two minutes), which, having been machine capped (in the case of bottles), are stored at a temperature lower than 50° F. until delivered within twenty-four hours to consumers.

Milk handled in accord with the above definitions of pasteurization and protection is justly entitled to be sold as Pasteurized milk.

Pasteurization and later positive pasteurization was first introduced by milk dealers as an adjunct to their business and have later been generally accepted by health authorities for health purposes.

The advantage of pasteurization lies in the fact that its close supervision is within the financial possibility of practically any municipality and the efficiency of its protective action is correspondingly high. It has the advantage, particularly in a large milk business, of so reducing waste as to practically offset the pasteurizing expense, leaving little or no economic burden upon the milk. In the larger cities the requirement of positive pasteurization results in such manifest improvement of the milk supply at so small an expense that the milk industry can be counted upon to support the movement. In the small cities and in the rural communities, where the expense incident to pasteurization becomes a tax upon the business, opposition to pasteurization requirements becomes more pronounced.

An ideal protection of the milk would consist of a careful supervision of the health of the cattle and of the people concerned in its production and handling, coupled with a positive pasteurization and prevention of subsequent contamination. The least expensive, most easily attained, and most productive step in this direction is usually the requirement of positive pasteurization and protection from subsequent contamination. This should be accompanied by such further effort at safeguarding the health of the cattle and of the people connected with the milk production as the circumstances will permit.

Rich Milk

The public purchases milk primarily as a food and quite universally judges the richness or food value of the milk by the amount of cream.

Because milk is peculiarly valuable as a source of materials for building and repair of tissue, and because it is the most readily available source of substances essential to the development of the young and the well being of the adult, any direct comparison between milk and other food substances on the basis merely of calories of available energy is distinctly unfair to milk. However the calorific content is a fair and convenient basis for comparing one normal milk with another.

A study of the composition of milk as shown by samples collected in the open market gives somewhat variable results because many of the samples so taken are from milk whose composition has been altered. A compilation of the results of analysis of milk of known purity shows quite accordant results. Table 1, taken from Circular 235 of the Illinois Agricultural Experiment Station, shows the progressive increase in net calorific energy per quart in normal milks ranging from 3 to 7 per cent in fat content.

From table 1 it is seen that a normal 3 per cent milk furnishes slightly less than 550 calories while a 4 per cent milk furnishes slightly more than 660 calories per quart. This variation in fat content is well within the range ordinarily found upon our local markets. However, if the 3 per cent milk is retailing at 15 cents per quart, on the basis of food value the 4 per cent milk is then worth 18 cents per quart, or put in another way if a workingman should adopt a strictly milk diet and get his 3000 calories per day solely from the milk he must drink practically a quart extra per day in getting this amount of energy from 3 per cent milk.

As the fat content of our local milk supplies retailing at the same price, particularly in the smaller and medium sized cities, ranges from 3 per cent to 5.5 per cent, it is important that the consumer be advised of the importance of more carefully considering food value in buying milk. A requirement that bottled milk be labeled as to its fat content is probably the surest way of getting accurate information on this subject to the consumer. With this should go the requirement that the fat content of the milk should always be up to the statement on the bottle.

While these statements lay stress upon the desirability of rich milk when all is selling at the same price, the fact should not be overlooked that all safe, clean, sweet milk is a peculiarly valuable food. Practically one-half of the food value of a normal milk remains after the fat has been removed and an increase in the use of safe, clean skim milk should be encouraged provided it is sold with a clear understanding that it is skim milk.

Clean Milk

The public uniformly demands and should have clean milk. There is, however, some difference of opinion as to what should be considered as dirt in milk. Some hold that it will simplify public consideration of milk problems and ordinances to consider the term dirt in milk as applying to such foreign matter as would ordinarily be covered by that term; while others hold that the bacteria, being in general objectionable, should also be considered as dirt.

Much can be said in favor of the latter conception but under it one is at once confronted by the fact that bacteria are always present even in the best of milk and in the hands of the consumer their numbers vastly increase. The consumer is slow to understand when told that all milk is dirty and that even under his most careful handling it rapidly becomes more dirty. The enthusiastic advocates of sour milk drinks also resent the implication that they are urging the use of dirty milk. (*To be Continued.*)

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Veterinary Students Will Be Trained for the Army Veterinary Corps

THE Act of Congress approved June 4, 1920, which amends the National Defense Act approved June 3rd, 1916, authorized for the first time the formation of veterinary units of the Reserve Officers' Training Corps.

The primary object of the reserve officers' training corps is to train students so that they may become qualified for, and be commissioned in the officers' reserve corps. The Act also requires that appointments to the veterinary corps of the regular army, shall be made from reserve veterinary officers.

The great need for a trained nucleus of reserve veterinary officers was demonstrated during the late war, and it is believed that the preliminary training in colleges as now provided by law will prevent the recurrence of such conditions.

It is the intention of the surgeon general gradually to approach all recognized veterinary schools in the United States that have sufficient enrollment of students to meet the requirements of the present law with a view to the formation of veterinary training units. For this year, only four veterinary units will be established, one at the New York State Veterinary College at Cornell University, one at the Ohio State University, one at the Iowa State College and one at the Kansas State Agricultural College.

The act of June 4, 1920, provides for the organization of veterinary units of the R. O. T. C. with a minimum of 50 students and a minimum of 90 hours' military instruction yearly for the four years. In view of the fact that military training for the first two years in practically all state veterinary colleges is compulsory, it is a great advantage to the students to have this training in veterinary units which will prepare them for commissions in their professional branch in preference to training in other units, as has been the case heretofore.

Upon completion of the sophomore year, such veterinary students as are selected by the professor of military science and tactics and the head of the institution for further training may be admitted to the advanced course during their last two years, i. e., the junior and senior years.

A six-weeks' voluntary camp will be held annually for students in the summer following the completion of their freshman year. A six-weeks' compulsory camp for all students in the advanced course will be held annually each summer for students who have completed their junior year. Upon arrival at the camp students will be issued necessary uniforms and equipment by the government.

In addition students in the advanced course receive commutation of subsistence at the rate of fifty-three cents per diem for the last two years that they are members of the R. O. T. C., except such time as they may be in camp, when rations are furnished in kind. Under this provision a veterinary student who is a member of the R. O. T. C. will receive from the government approximately $16.00 per month while he is pursuing the junior and senior veterinary courses.

All students attending advanced course

camps are paid at the per diem rate of enlisted men of the seventh grade of the army, or $30.00 per month. In addition, students receive a traveling allowance while proceeding to and returning from such camps, at the rate of five cents per mile and are entitled to quarters, rations, admission to military hospitals and medical attendance and medical supplies while attending such camps.

The professor, or assistant professor, of military science and tactics will be a veterinary officer of the army who is *persona grata* to the authorities of the institution to which he is assigned. He will be in charge of the veterinary unit in the department of military science and tactics, under the head of the institution, at the school to which he is attached. In general, lectures which properly should be delivered by him will fall under the following headings:

Brief history of the regular army.
Organization of the army.
Organization of the veterinary corps.
The function of the veterinary corps in campaign.
Customs of the service.
Subsistence of the army and supply methods.
Records and clerical methods in army administration.
Manual of the medical department as it pertains to the veterinary corps and administration of the veterinary corps.
Special regulations No. 70 with changes No. 1.
Circulars and other veterinary publications, S. G. O.
Types of veterinary hospitalization used by the army in peace and war.
Field service regulations.
Brief history of the veterinary corps in the civil war, the Spanish-American war, the Philippine campaigns, the Mexican border trouble and the European war, with lessons learned.
Explanation of some of the more important army regulations.
Military law.
Laws of war.
Animal sanitation.
Army meat and dairy inspection service.

At the camps, members of the R. O. T. C. units will be given practical instruction in military duties and an opportunity to demonstrate in the open the theoretical knowledge they have acquired in the military courses at the schools.

Aside from the experience to be gained by attendance at these encampments, another factor worthy of consideration is the opportunity they will afford the student for a vacation after his year of intense application to study in the veterinary school. These camps will provide him with an "outing" in an attractive and healthful environment and occupy his mind along lines foreign to those upon which he had recently engaged, all at no expense to himself.

The course of instruction to be given will be progressive in character, beginning with the life and duties of a soldier and gradually leading up to those of a junior officer. As far as possible field service conditions will be approximated. The students will probably be required to live under tentage in a camp exclusively set aside for them.

In general, the courses to be developed at these camps will be practical and will cover:

Drill, first-aid methods, and general instructions in the requirements of individuals and groups in the field.
Duties of non-commissioned officers and enlisted specialists.
Organization and use of veterinary corps units.
Use of field equipment and appliances.
Animal sanitation.
Horsemanship and equitation.
Methods of handling, treating and evacuating sick animals.
Small arms practice (pistol).

In starting the unit every effort will be

Office and ambulance of Dr. B. F. Murray, canine and feline specialist, Oakland, Calif.

made to enroll as many members of the junior class as have completed their two years of compulsory training and have been recommended for advanced training by the professor of military science and tactics and head of the institution.

The opportunity to join the R. O. T. C. should prove very attractive to many young men contemplating taking a veterinary course and should aid not a little in increasing the attendance at veterinary colleges where such opportunity exists.

CLINICAL MEDICINE AND THE LABORATORY

Once upon a time clinical medicine progressed unsupported; and it made wonderful progress. By digging, excavating, exploring, discovery after discovery was added to its budget of knowledge. Today it seems to sit idly by awaiting discoveries from the research laboratories, just as though the observations of the practitioner were no longer worth while. In the work of solving the many problems awaiting solution in every branch of veterinary science much still depends upon the acumen of the practitioner at the "bed-side". We should not lose that keen sense of observation that the absence of the microscope developed in the old practitioners, and which enabled them to arrive at conclusions that have stood the test of many decades and even of centuries; and if we added to this the many good things our laboratory confreres can do for us we would soon find a much smoother path to travel and our achievements would multiply.

The aggregate perception derived from a keen utilization of the combined special senses is susceptible of inconceivable development in any individual. We speak of inspection, palpation, auscultation, olfaction, and gustation in a commonplace manner without a thought often of all the possibilities these processes actually comprehend, and if we always carefully weighed the evidence each one of them is capable of supplying, there would be fewer mistaken diagnoses, and fewer puzzling situations that the laboratory is asked to solve.—L. A. M.

A good physician is one who, having pure drugs, knows when to use them, how to use them, and, equally important, when not to use them.—Hare.

DECREASE IN EQUINE PRACTICE

Statistics show that the decline in the number of horses and mules in the country during the past year and during the past decade has been slight, and yet it is a matter of common knowledge among veterinarians everywhere that the decline in equine practice has been very great; in some cities and sections of the country, reaching sixty per cent. Some wonder has been expressed as to the cause of this condition, and while probably many factors enter into it in one way and another, some of the principal causes are not difficult to see.

There has been a very material decrease in the number of horses in service in a number of the large cities and this, of course, accounts for its proportionate share.

The exceedingly high cost of feed during the past two years has brought about a more careful, a much more careful system of feeding in nearly all city barns, with the result that overfeeding is now all but unknown, and the many digestive derangements that followed in its wake no longer require the attention of veterinarians.

With the disappearance of heavy feeding has come a great reduction in the amount of azoturia. Further, it is probable that the entire disappearance of corn from the ration of city horses has contributed to this decrease, since there is considerable evidence that animals fed heavily on corn are more prone to azoturia than those fed on oats and other grains.

The absence of heavy feeding and the absence of corn from the diet has been a factor in the lessened number of overheat cases that veterinarians of the city are called upon to treat. An even greater factor in bringing about the lessened number of overheat cases during the present season, perhaps, has been the unusually cool weather.

The better paving in the cities and the almost universal use of some sort of pads in the shoeing have contributed greatly to the reduction in the number of nail pricks and foot cases in general.

But, the most important factor of all in the decline of equine practice in the cities is undoubtedly the motor truck. The heavy loads are now moved by mechanical power and the long hauls also are made by trucks. By and large, it is the team exhausted by the long haul or which has

pulled to the limit of endurance and beyond, on an exceedingly heavy load, that furnishes the majority of the cases not only of exhaustion and overheat, but of pneumonia, pleurisy, indigestion, lameness and accident cases.

Owing to the fact that the number of horses in the city is still being reduced from year to year and month to month, the number of new horses sent to the city is abnormally small, and consequently the cases of shipping fevor, influenza and pneumonia are fewer than normal.

Causes of the Decline of Equine Practice in the Country

Equally obvious are some of the main factors that brought about the decline in the amount of equine practice in the country. The slump in horse breeding operations of recent times has, of course, decreased the amount of obstetric work, castration, diseases of the foal, of the young horse, and of the pregnant and parturient mare.

The driving team or the farm team used as drivers no longer is taken from the customary work of the field for the hard drive to the city, fed in a strange livery barn or feed yard, watered irregularly, with the consequent call on the veterinarian to treat colic or milder forms of indigestion, or perhaps a strain or a nail prick, or it may be pneumonia, as a result of being allowed to cool off at the village hitch rack. Probably the chief reason for the decline in equine practice in the country is due to every farm now being virtually a quarantine station. The farmer uses the automobile as a means of transportation for himself and family. No longer are teams from every farm in a given locality gathered together in the cities and villages on Saturday afternoon to freely exchange diseases and ailments with one another. No longer is the public watering trough in the city a menace to hundreds of farm horses. No longer are horses on different farms brought in contact wtih one another when their owners may be visiting about the neighborhood.

Under the conditions at present, a horse may be reared on a farm from colthood to old age and scarcely be off of that farm, or associate with strange horses any more than if he were under a rigid quarantine for the entire time.

These conditions are not likely to change materially, and a proportionate decline in equine practice in the cities and in the country may be said to be permanent. The automobile has not displaced any great proportion of the horses on the farm and, as was pointed out last month, the tractor will not displace at the outside more than six per cent of the farm horses; but mechanical power has lessened the amount of veterinary practice among horses out of all proportion to the number of horses it has displaced and may lessen it even more.

The far-seeing veterinarian will lose no opportunity to extend his usefulness and his practice among the food-producing animals and fowl.

POULTRY PRACTICE

FOR nearly a decade, we have been urging veterinarians to prepare themselves for poultry practice and interest themselves in building up poultry practices in their communities. In this time, more poultry case reports and more discussion on poultry diseases have appeared in our columns than have been published by all other veterinary publications. Much progress has been made. That an entire edition of 3,000 copies of Kaupp's "Poultry Diseases" and almost half of a second edition has been required to supply the demand from veterinarians for information on the diseases of birds is indicative of the interest that has been shown in poultry practice, but this is not enough.

That poultry practice is a subject in which every practicing veterinarian not located in a large city should be interested. is more and more apparent.

There are numberless flocks of chickens whose value runs well into thousands of dollars, owned by poultrymen who would be eager to employ competent veterinarians when the birds are sick if veterinarians skilled in poultry practice were to be had in their localities. We do not believe that veterinarians generally know that many birds sell for prices upwards of $500.00, and that it is indeer a poor commercial flock that is not worth this amount. Yet, such is the fact.

Poultry practice is to be builded as is any other practice. First the veterinarian must be qualified in this line; by no means an impossible task. The information is easily available. It is simply required that he shall study it. When he "delivers the goods", the veterinarian will have no more

difficulty in winning the confidence and the business of the poultry owner than he has in acquiring standing in any other line of veterinary work.

Veterinary colleges have, as usual, in the main been remiss in this matter. Just as they slighted the diseases of the meat-producing animals and considered horse clinics sufficient for the training of their students until outside influence forced on them the importance of, and the necessity for more elaborate instruction and better clinical presentation of the diseases of cattle and hogs. so they have in the past, and are still neglecting poultry pathology.

The Committee on Intelligence and Education of the A. V. M. A. was instructed to outline a course of study for approved veterinary colleges. It is hoped that in this proposed course, poultry pathology be given a place in keeping with its importance at the present time and the position it is destined to occupy in the veterinary practice of the near future.

Department of Laboratory Diagnosis

Edited by Dr. C. A. Zell

NO EVIDENCE OF POISONING

I am sending you by parcel post, today, a portion of a steer's stomach and some of the contents of the rumen. The owner feels confident that someone is poisoning his steers. This is the fourth to die under similar circumstances in six weeks.

Symptoms: The mouth was held open, the tongue protruding; the head was held to one side and the animal would walk into a fence or a barn, apparently without seeing it. Peristalsis was in entire abeyance. No action of the bowels could be induced by cathartics.

I have been unable to find anything in the pasture that would be harmful to these animals. The first three animals died while they were on highland pasture, then we changed them to a hay field. The owner is very anxious to have a diagnosis, but I declined to make one, as I do not have a definite idea of what is the trouble. I have urged him to call in another veterinarian, but he does not want to do so.—H. E. B., Indiana.

REPLY: The stomach consisted of a coarse mass with an alkaline reaction. The chemical examination gave no evidence of the presence of poisoning, and bacteriological examination revealed no pathogenic organisms. No diagnosis could be made from the material sent.

It would be interesting to follow this case up, and I suggest that you send a sample of blood from any affected animals, collected under aseptic conditions, and also if another animal dies, send portions of various organs, intestines, liver, lung, lymph-glands and any tissues that appear abnormal, packed in borax.—C. A. Z.

ROUND-CELLED SARCOMA COMPLICATES CRYPTORCHID CASTRATION

I am sending a specimen that I believe will be of interest. It was taken from a cryptorchid, six years of age, which had been unsuccessfully operated upon by three different empirics.

I was called to operate and used the flank method. I passed my hand directly into the abdominal cavity and was unable to locate the testicle. The animal died six days later from infection, and autopsy revealed the condition present in the right testicle, as shown in the specimen. The left testicle was found suspended in the abdominal cavity.

REPLY: The right testicle appeared practically normal, except that it was about three-fourths the normal size. The left testicle showed typical retarded development, fatty degeneration and fibrous hyperplasia. In a comparatively small area, in microscopic sections, there were signs of malignancy.—C. A. Z.

WORM CAPSULES HARMFUL FOR PIGS

Kindly let me know if there is anything harmful in the worm capsules for pigs, which I am enclosing. These capsules were purchased by a farmer from a farmers' supply house in Chicago. They were administered by a careful veterinarian to a herd of seventy-one pigs, with the result that thirty-five of these pigs died and several more will die.

Every pig autopsied showed a necrotic area adjacent to the pharynx, and severe pneumonia, probably due to part of the necrotic mass gravitating into the lungs.

I would like to know whether the capsules are dangerous or if this condition is found in all cases where worm capsules do not enter the esophague.—T. H. L., Ohio.

REPLY: A chemical examination of the capsules revails only oil of chenopodium and an inert binding matter.

Oil of chenopodium is an effective and recognized anthelmintic and not dangerous where properly used in reasonable doses. Like many anthemintics, it is violently irritating in concentrated form, and of course, is dangerous if it goes the "wrong way." If the capsules failed to enter the esophagus, if for example, they were delivered into the larynx with the balling gun, or forced into the tissues about the pharynx, the result would be just such sloughing as you have described, and portions of the chenopodium inspirated, would undoubtedly set up a violent pneumonia such as many of these animals suffered from.

We cannot readily conceive of a careful veterinarian administering capsules or other preparations of which he has not the slightest idea of their composition. At the same time, it is difficult to account for the failure of the capsules to enter the esophagus in such a large percentage of the cases. A bacillus necrophorous infection should be thought of in this connection, but that it would affect so large a number in so short a time, and all in the same location, is not among the probabilities.

About all that can be said from the laboratory examination, is that the capsules contained an agent capable, under certain conditions, of producing the results found at the autopsies.—C. A. Z.

Eichhorn Takes Issue With Van Es and Martin

Recently I received two publications: one on "The Immunizing Value of Commercial Vaccines and Bacterins against Hemorrhagic Septicemia"; the other on "The Value of Commercial Vaccines and Bacterins against Fowl Cholera", both by the same authors, L. Van Es and H. M. Martin, published by the Agricultural Experiment Station of the University of Nebraska as research bulletins 17 and 18. After carefully studying these bulletins I was very much surprised to note that the authors had entirely disregarded any work previously carried out along the same line. These publications have been widely circulated, and no doubt many veterinarians will accept the summary as conclusions of carefully conducted research work.

I do not deem it advisable to analyze the publications at this time and only wish to call attention to Bulletin 18 on "The Value of Commercial Vaccines and Bacterins against Fowl Cholera", in which the conclusions are as follows:

It is evident from the above that no reliance can be placed on the vaccines and bacterins against fowl cholera, which we are able to find on the market and subject to definite tests. We have no doubt as to the possibility of artificial immunity as an aid to the control of fowl cholera, but as yet we will have to get along with the more non-specific means of prevention, even if those are far from a universal efficiency.

In the face of these conclusions I have before me a publication on "The Use of Bacterins in the Control of Fowl Cholera" by Dr. Winifred B. Mack and Dr. Edward Records, published by the Agricultural Experiment Station of the University of Nevada. The authors of this bulletin have both established splendid records in research work on animal diseases and do not need any further introduction. Their experiments are recorded in an up-to-date thorough manner, giving detailed data on every phase of the work. In the conclusions of the last named publication we find the following paragraphs:

The use of bacterins in infected flocks pro-

duced sufficient resistance to promptly check outbreaks of fowl cholera in fifteen out of sixteen lots of fowls in fourteen flocks, although one flock required three treatments. It failed in another flock in spite of three vaccinations.

The results of field trials with bacterins as an agent for checking and controlling outbreaks of fowl cholera indicate that it is a practicable, satisfactory method.

In fourteen out of sixteen lots of fowls treated, one or two injections of bacterin satisfactorily controlled the outbreak, with little or no difference in the result. In one lot there was recurrence requiring three treatments. Complete failure resulted in but one of the sixteen lots treated.

There was no apparent difference in the results whether homologous or heterologous strains of Bact. avisepticum were used in the preparation of bacterins. The use of stock bacterins containing several strains appears to be satisfactory, and is the logical method where a stock is to be carried for immediate use when needed.

Finally, in the last analysis, the value of a protective method must be judged by clinical rather than by experimental results.

Here we are face to face with entirely contradictory results. Besides as there are many other investigators in this country and abroad who arrived at results similar to those of Drs. Mack and Records, how should the veterinary profession judge the publications of Drs. Van Es and Martin? It seems if the work of Van Es and Martin would be carried out with any human or veterinary biological products in a manner as recorded by the authors, I dare say we would hardly have today a single biological product which could be considered dependable for the prevention or cure of diseases. Even the classical work of the great Pasteur with regard to the immunization against anthrax would be shattered. Just think what would have been the result of the wonderful experiments at Pouilly-le-Fort demonstrated by Pasteur before a commission on the effectiveness of anthrax vaccination, if Pasteur had not have given careful consideration to the infective doses of the virulent anthrax bacilli which were administered to the immunized animals.

A. EICHHORN.

Pearl River. New York.

DEPARTMENT OF

CATTLE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

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Mastitis and Sterility in Holsteins

I would appreciate some information on the following cases.

I have a herd of pure-bred Holsteins under treatment, the conditions being as follows: A cow apparently well in the morning will come from the pasture at evening and give thick, lumpy milk from one quarter. After a week or so the condition sometimes disappears without treatment. Then another cow will be affected in the same manner; the trouble may cease or it may become worse. Three were affected like the following case:

The cow was apparently all right in the morning. At night the milk from one quarter was lumpy and pussy. The condition continued for a week, three quarters finally being affected, when I was called. I found a temperature of 105° F.; udder very hot and swollen; appetite poor; milk stringy and lumpy. I advised hot fomentations, cathartics, etc. In twenty-four hours improvement was noted. The animal seemed to feel better and eat better, but the udder condition was worse; that is, the milk became nasty, purulent and pussy (so the owner told me). In these cases after two or three months the milk dries up and the cows become sterile.

The owner has been trying to breed one of the cows for the past eighteen months. She comes in heat every twenty-one days. Different bulls have been tried but to no avail. I saw this cow after she went dry

and examined her for sterility. There was no acid reaction; secretions not very tenacious. I advised flushing with bicarbonate, without benefit.

Why do these cows become sterile? Please advise if possible, and suggest treatment to follow.—H. J. M., Ind.

REPLY: Unless the condition of the herd you speak of is different from anything I have observed, I question if the udder trouble and the sterility have anything in common. I have often seen cases of udder trouble of the character you describe and have always considered them due to streptococcic infection and stable infection, rather than to pasture infection, and in dairies where instructions are carried out to the letter, the loss of a quarter is the exception rather than the rule.

For these cases I have tried almost everything that has been suggested in the way of applications, medications, bacterins, etc., even using the milk and udder secretions in an attempt at autogenous treatment, but up to the present time we have always had to resort sooner or later, to the old line treatment; that is, thorough disinfection of the stable, at least once daily, even though the cows are not kept in it long enough to lie down, and partial isolation of the affected animals. The udders are disinfected with some non-irritating solution, and, of course, these animals are milked last. The attendants are instructed to wash their hands well after milking each cow and the good quarters of the affected udders are milked first.

In severe cases the animals should be given daily mild doses of a saline cathartic, for several days, and fed lightly of succulent and sloppy feeds.

Where the value of the animal warrants it, the affected quarters should be massaged and stripped every hour, after first being bathed with very warm water. Thorough massaging is absolutely necessary in order to break down the organized secretions and to induce metabolism. Thorough rubbing of the parts with a good stimulating liniment after massaging is of material advantage. The last thing at night the affected quarters should be thickly covered with antiphlogistine or some similar preparation.

For medication I prefer large doses of hyposulphite of soda night and morning, and dram doses of formaldehyd during the mid-forenoon and afternoon, given either in milk or a bland oil.

As to the sterility, I would suspect diseased uterus, ovaries or tubes. If there is no cervicitis, no catarrh of the uterus nor catarrhal discharge, a careful examination may reveal a salpingitis or atresia of the tubes. If the cervix, uterus and tubes are normal, it is highly probable that the trouble can be readily relieved by gently massaging the ovaries a few times at weekly intervals. If the tubes are seriously diseased, which is not at all probable in all the cases, little can be done. If there is a cervicitis, or catarrh of the uterus I would refer you to the articles that have recently appeared in this Journal.—J. F. D.

WAS THIS PARTURIENT PARESIS?

On March 10th I was called to see a cow which was of the Holstein breed and a heavy milker, and had calved eighteen days before I received the call.

This cow did not have any difficulty in delivering a fine heifer calf, and the owner said the cow was in good health up until the day before he called me.

This cow was off feed the day previous to my call, and was milked on the morning I saw her. She did not give the usual flow of milk and when she was taken out of the stanchion to be turned out, she was unable to handle her hind parts and went down in a few feet from where she was turned loose.

When I examined the cow, she was down, but in a natural position and eating hay which was placed before her. These are the symptoms I found. Temperature normal, pulse normal; good bright look out of eyes; head held erect; not many symptoms of milk fever. While the owner went to the house for a pail of warm water, I took the cow by the tail and she got up and walked thirty or forty feet and stopped, still standing. We got her into the stanchion, and I gave air treatment for milk fever and also a physic through the mouth, which I know is contraindicated in cases of milk fever. Cow could swallow nicely.

This cow was being fed on silage, clover and prairie hay.

Was my treatment right? The cow is making a nice recovery.—A. L. W., Kans.

REPLY: This is another of those cases with nothing regular about it. There is, of course, the possibility of thrombosis, but if due to that the animal should have risen after a short time. An injury to the spine from falling is also possible; if due to this and the paralysis so complete, the hind extremities should have shown coldness after a few hours.—J. F. D.

WHEN ABORTION OCCURS SUSPECT THE INFECTIOUS KIND

I am thanking you in advance for the extended privilege you so generously vouched us poor every-day practitioners in assisting in doubtful diagnosis.

I refer to abortion. Occasionally I find a cow in a herd that does abort, but do not consider it contagious. Now, in this particular case, a valuable imported Jersey, four years old, in shipment, carefully crated, by express, thirty hours, on arrival seemed all right, only nervous, no elevation of the temperature. Five days after arrival she aborted. The fetus was dead. She was 186 days pregnant, seems normal, and is giving an increasing flow of milk every day.

The usual and most careful precautions and sanitary measures were carried out. We have a small and selected herd and want to be sure it is not of infectious origin. By examination of placenta and umbilicus of fetus (which I have) could it be determined if it is contagious? Where can I send same to be examined? Any and all information will be appreciated.—L. T. D., R. I.

REPLY: A pretty safe rule is to consider all cases of abortion as infectious and isolate all such animals, then practice strict sanitation and thorough cleansing of the uterus for several days after freshening, beginning 24 hours after parturition, by irrigating with a normal salt solution, keeping in mind that two things are necessary, namely: 1st, Irrigation must be done while the uterus is still strong. 2nd, It must be thorough. A few quarts of water injected into the uterus is farcial and of no value. It often requires 40 or 50 quarts of warm salt solution to thoroughly rinse and clean a large infected uterus. This is particularly so for the first few days when the membranes are held or there is other debris held in the uterus.

Examination of the placenta or umbilicus will give but little information; a complement fixation test of the blood might determine whether or not the animal harbored the Bang bacillus, but would not necessarily be positive proof *that this particular* case of abortion was due to this specific infection, however such tests strengthen the present belief that but a small percentage of abortions are due to any other cause.—J. F. D.

PARTURIENT PARESIS FAILS TO RESPOND TO UDDER INFLATION

On two occasions, I was called to treat cows for milk fever that did not yield to regular treatment. Needless to say, they were good young healthy cows and had plenty of good feed.

I gave them my regular treatment; inflated the udder and gave them hypodermically, one-fourth grain strychnin every fifteen minutes until three or four doses had been given. As they did not seem to yield to the treatment, I decided to use fluid extract of viburnum prunifolium, which is sedative and tonic to uterine and ovarian nerve centers. I gave two half-ounce doses, thirty minutes apart. Was it possible to get any effects from my viburnum prunifolium?

Sisson says that the sympathetic nervous system of the cow is practically the same as that of the horse. That being authoritative, we must remember that the nerves to the udder and uterus are very closely woven together.

The nerves to the udder are the inguinal (which is derived from the second and third lumbar) and the posterior mesenteric plexus of the sympathetic.

The uterine nerves are derived from the sympathetic through the uterine and pelvic plexuses. The uterine plexus is derived from the posterior mesenteric plexus. The pelvic plexus furnishes the motor fibers to the uterus, bladder, etc.

I would like to see this discussed in the Journal by some experienced man.—F. A. K., Ind.

REPLY: Of course, there is much doubt and not a little speculation as to how inflation of the udder benefits animals with milk fever, and I think on the whole, that the treatment for milk fever is pure empiricism, just as the use of the same treatment is empiricism in that type of forage

poisoning rather common in some localities, the symptoms of which simulate those of milk fever. In such cases the inflation of the udder is often as beneficial to the patient as it is in cases of true milk fever.

An ailment of cattle referred to as cerebrospinal meningitis and sometimes as encephalitis, has been described in European veterinary literature, where inflation of the udder aggravates the symptoms. There is some doubt about the accuracy of the diagnosis or the reliability of the observers in these cases.

In my article on parturient paresis I make special mention of the cases that have defective quarters, that cannot be satisfactorily inflated. You do not mention this condition being present, and if it were not present, and your inflation was thorough, I can offer no explanation why the cases did not respond unless they were cases of protein poisoning due to being fed excessive amounts of cotton-seed or linseed meal rather than true cases of parturient paralysis.—J. F. D.

IRRIGATE ONLY THE RECENTLY GRAVID INFECTED UTERUS

Your article on sterility in the AMERICAN JOURNAL OF VETERINARY MEDICINE, is very much to my liking. I have proved your stand on instrumentation. It accords with my experience exactly. I have found that the less I use instruments and injections in treating sterility, the better for the patient.—E. R. V., N. J.

REPLY: It is gratifying to have so practical and experienced an authority as yourself agree with my views on the question of irrigating or attempting to disinfect a virgin uterus or an empty involuted uterus.

I object to douching the apparently normal uterus but have always advocated douching a recently gravid infected uterus. This is diametrically opposed, in both instances, to the first teaching on this subject in this country. The earlier teaching has done harm that it will take time to correct.

Many cows that would breed normally may be prevented from breeding by irritating the cervix in repeated attempts to disinfect the uterus. This practice should be discouraged, as it is doing much harm.—J. F. D.

HYPERIDOSIS IN A COW FROM OBSCURE CAUSE

I would be pleased if you could give me some information on the following case, in the Journal.

The cow when giving birth to her first calf, about five weeks ago, did not expel the placenta. An empiric removed it four days later. The cow went off her feed and failed in her milk flow, but after being douched a few times, became all right.

The calf was very large at birth, and now weighs nearly two hundred pounds. Two men assisted in the delivery, by exerting traction.

The cow eats heartily. Her temperature and pulse are normal, but she has a discharge from the right nostril and breathes heavily when exercised. The os uteri is closed and the vagina is apparently normal. The animal seems normal in every way, except that she sweats profusely from head to tail when the calf nurses. She is of a quiet disposition and never flinches when the calf suckles. This condition has prevailed for about ten days.—L. B. H., Ohio.

REPLY: This certainly is an interesting case. You do not mention a single abnormality that would even give a clue as to why the cow sweats. Perhaps some physiologist can explain it; I certainly cannot, if the animal is perfectly normal so far as can be determined by a physical examination.—J. F. D.

REPLY BY DR. H. D. BERGMAN: Sweating is a nervous phenomenon. The sweat-glands are supplied with definite secretory nerve-fibers which stimulate sweat secretion by a direct influence on the cells of the sweat-glands. The fact that sweating is produced reflexly by a variety of external influences would imply the existence of definite physiological nerve-centers in the central nervous system which control the activity of the secretory fibers to the sweat-glands. There is experimental evidence that would tend to show the existence of a general sweat regulating center in the medulla and in addition, spinal subcenters.

Sweating may be produced by a wide variety of afferent influences. External heat, dyspnea, muscular exercise, painful influences, and various psychical states will stimulate sweat secretion by influencing the cells of origin of the sweat nerve-fibers in

the central nervous system. Certain drugs such as pilocarpin, physostigmin, and arecolin stimulate sweat secretion by direct influences on the secretory nerve terminations in the sweat-glands. Pathological conditions will often cause unusual sweating.

In the domesticated animals the sweat-glands occur in the simplest form in the ox, being described as rudimentary, and, as a consequence this animal sweats very little. Sweating from the general surface of the body is, however, occasionally observed. In the case of the cow in question it would seem that the sweating described is the result of an exaggerated nervous reflex, the exact cause of which is obscure but which is apparently associated with the nursing of the calf.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOUGNAL OF VETERINARY MEDICINE and no charge will be made for this service.

Weeds Poisonous to Livestock in Alberta

Dr. P. R. Talbot and Mr. J. C. Hooper, the principal biologist of Alberta, have issued a neat and valuable bulletin with colored illustrations on live stock plant poisons.[1] These authors preface the bulletin with the following statement:

"Poisonous weeds cause heavy losses of live stock annually to many ranchers and stockmen in Alberta. It is estimated that there is more loss of live stock from plant-poisoning than from any other single source. This loss is due largely to the fact that many ranchers and stockmen are not acquainted with the various poisonous plants, and consequently are not able to use measures to prevent stock from eating the poisonous weeds, or to give the proper treatment to poisoned animals."

He states that the following plants are the most poisonous: "Tall larkspur, low larkspur, death camas, water hemlock, white loco-weed, woolly loco-weed, and showy loco-weed. These poisonous weeds may occur on ranges and other grazing areas, and may be found in hay cut on native prairie meadows. When stock are grazing on ranges and pastures there are several circumstances which tend to increase the danger of plant poisoning.

"The poisonous weeds usually begin to grow early in the spring, offering green, succulent forage before the native grasses have made much progress. Hence, stock may be tempted to eat this poisonous food before good forage becomes plentiful

"In the early spring months, during rainstorms and late snowstorms, stock often seek shelter in coulees and ravines. Certain poisonous weeds, especially the tall larkspur, grow in these locations, and stock are thus exposed to these plants, when they are very poisonous.

"After snowstorms, grazing plants are often covered and only the poisonous plants are left standing above the snow.

"When stock come out from their places of shelter, where they have remained during long-continued rains, they are very hungry and exercise little discrimination in their choice of forage.

"It is believed that certain plants are more poisonous when wet with rain or dew than under other conditions.

"When the ground is wet after rainstorms, animals can much more readily pull up the roots and bulbs of plants, as they pull or nip off the stems and leaves. In some plants, such as the water hemlock, much of the poisonous principle is contained in the rootstock and roots, and

[1] Bull. Dept. of Agriculture, Province of Alberta, 1:1-40, 1-15, 1919.

in the death camas much of the poisonous principle is contained in the bulb.

"The greatest losses of sheep from poisoning occur when sheep are being transferred from one range to another. This is due to the fact that they cannot make the same choice of forage while being hurried over the range as they can when they are allowed plenty of time to spread out and select their food. When sheep are being trailed from one range to another, they should be handled in such a way that they never become very hungry at any time. Before they begin to move they should be allowed to fill up. Each night, herders should see that the sheep are 'bedded down' in the best pasture obtainable. Then in the morning good pasture will be near at hand and the sheep can begin grazing early. The action of the poisonous principle seems to be more rapid when the sheep are hungry and hot."

To prevent losses from poisoning they recommend eradication of the weeds. This is not likely to be accomplished. It would not seem practicable to fence the weed-infested areas as recommended by the authors. They make the excellent recommendation that the stock should be herded away from poisonous areas. In regard to salting they say:

"All kinds of live stock require a regular and plentiful supply of salt. If an animal does not get its required amount of salt, it develops a perverted or depraved appetite, and will then eat poisonous plants that it possibly would not touch, if its appetite were normal. Animals should be supplied with salt regularly and abundantly. The salting grounds should not be near poisonous weed areas during the periods when the weeds are dangerous. The salting grounds should be changed from time to time, in order that the pasture near them may not be grazed too closely, and only objectionable plants left.

They note that hungry stock show little discrimination in their choice of forage. "If animals are in a very poor condition when they are turned out in the spring, they should be put on a range that is free from poisonous weeds. Every precaution should be taken to see that stock do not become too hungry at any time. A range should not be allowed to be eaten down too closely."

In regard to tall larkspur the authors state: "All parts of the tall larkspur are very poisonous, but the young stalks and leaves cause the greatest loss of cattle.

"The tall larkspur is probably one of the most destructive of the poisonous plants that we have in Alberta, especially in the southern part of the Province. Each year large numbers of cattle are lost in the foothill pastures. From what is known at the present it is thought that horses are occasionally poisoned by it, but the losses in horses are insignificant.

"The first symptom will probably be the sudden falling of the animal. When cattle have been feeding on pasture which contains larkspur and are started up suddenly or are driven rapidly from the spot where the plant has been eaten, the symptoms seem to develop quickly. There is usually a general stiffness of the legs and difficulty in walking which causes the affected animal to lag behind the herd and finally lie down. In many cases it will regain its feet, stagger along with its hind legs spread widely apart, only to fall after a few steps in violent convulsions. Spasmodic twitching of the muscles of the sides of the legs appears intermittently."

As to treatment the authors recommend:

Physostigmin salicylate	1 grain
Pilocarpin hydrochlorid	2 grains
Strychnin sulphate	½ grain

In regard to the water hemlock (*Cicuta maculata*) the authors state:

"Cattle are the most frequent sufferers from water-hemlock poisoning, horses and sheep occasionally, but under certain conditions it is well to remember that it is dangerously poisonous to all classes of stock.

"The poison contained in the root acts rapidly and is deadly. The first symptoms frequently appear in 30 to 60 minutes after the root has been eaten, but where only a small quantity is taken the animal may linger along for two or three days, and in some cases eventually recover. The first irregular condition noticed will be frothing at the mouth accompanied by pronounced uneasiness. When the animal falls to the ground violent convulsions take place. In some animals great

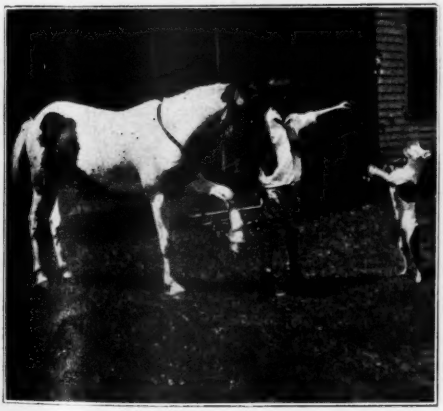
distress and excitement are manifested, and during the period of convulsions they bellow and groan with pain. The breathing is often hurried and irregular, the pulse rapid and weak, there will be well marked dilation of the pupil of the eye, and a gradual stiffening of the legs with the head and neck frequently bent backward. The convulsions vary as to duration and intensity, the periods gradually becoming shorter, until coma takes place and death ensues. They recommend the use of potassium permanganate for cattle, 1 dram of potassium permanganate, 1 dram of aluminum sulphate dissolved in water. This preparation in some instances has given beneficial results.

DARNEL POISONOUS

Mr. V. W. Flint, Allison, Iowa, sends a specimen of darnel (*Lolium tenulentum*). This is often common in oat, and sometimes in wheat fields. It is an annual. The weed has come to me two or three times lately from different correspondents in the state. Much has been written of darnel being poisonous, but there are really no authenticated cases of poisoning in the United States. This grass was recognized as being poisonous by the ancients, and it in written in the Bible, "But while men slept his enemies sowed tares among the wheat." Darnel was formerly frequently ground up with the wheat and made into flour. The seed produced poisonous effects upon the system such as headaches and drowsiness. It is said that the poisonous properties reside in a narcotic principle (Lolium). This principle causes eruptions, trembling and confusion of sight in man and flesh-eating animals. It is said to have no effect on horned cattle or ducks, but is most injurious to rabbits.

It is interesting in this case to note that there is a fungus found in the fruit of darnel weed. Whether or not this is a poisonous substance has not been determined. Several of the related species of the genus do not have this fungus and these classes are not regarded as injurious.

Pride of ownership, joy and happiness are "registered" in this snapshot of Dr. McGreevy's children and their trained pets.



Children of Dr. A. F. McGreevy, Sioux Rapids, Ia., and their trick pony and trained dog. Photographs sent in by Mr. C. W. Kelly of the Sioux City Serum Co.

Department of Surgery

By DR. L. A. MERILLAT

Surgical Allusions

(Continued from September issue)

8. "A man's a fool who is not afraid of a bull"—*Hoard's Dairyman.* This is strictly in line with the best teachings of animal surgery. The practitioner who flirts with fate in handling domestic animals sooner or later has cause for regret, as there are no fool-proof domestic animals. The daring practitioner is as much at fault as the timorous one. Carefulness is the desirable attribute.

Personal injury received from animals is as much an indication of incompetence as a misdirected incision, and the assurance of owners that a dog, or a bull or a stallion is perfectly harmless is no excuse.

9. The most unfortunate accidents of surgery occur in connection with restraint, and although they occur to the best of surgeons and sometimes in spite of the utmost precautions, almost all of them are due to carelessness or to improper methods. By tying all surgical subjects, from the smallest weakling to the most powerful animal, into a state of total helplessness many of these casualties will be avoided. It is often in simple operations that the accidents occur, because in major ones the restraint is usually planned with greater care. A Holstein-Friesian bull calf, seven months old, under preparation for exhibition, was snubbed up to a post to trim off its sheath hairs. In a forward lunge it tore off a horn. A suckling colt cast and loosely tied to wipe out a discharging umbilicus, fractured its femur. Parallel cases are numerous and each of them suggests the remedy above mentioned.

10. There is no better, nor more profitable, pastime for a practitioner than to take an occasional excursion into his old textbooks and toboggan among the forgotten fundamentals. It will be interesting to note how extremely valuable are many of the things we simply "crammed" to pass examinations, and how much useful knowledge acquired at college has not been retained. A visit with the old authors with a view of contrasting them with the new will strengthen your confidence in the former.—L. A. M.

11. According to experiments of Dr. J. F. Norton (Jour. A. M. A., July 31st, 1920) it has been proved that common soaps are better for surgical purposes than the advertised "antiseptic" varieties. The addition of antiseptics, especially mercurial salts, interferes with the cleansing potency of a soap without adding a germicidal property to compensate for the loss. It was shown that it is the abstergent and not the germicidal property of soaps that disposes of bacteria.

(To be continued)

A NEW RESEARCH ON CHRONIC ROARING FROM LARYNGEAL HEMIPLEGIA*

In a continued article running through four numbers of the Annales de Medicine Veterinaire the author relates a series of experiments, observations and researches dwelling in great detail upon the disputed points of this interesting and important equine affliction. The author succeeds in proving that at least some of our orthodox imputations are erroneous. The cause of the dyspnea and the roaring we have been given to attribute to obstruction of the larynx by the flaccid arytenoid and vocal cord being drawn inward and downward by the inspired air. Others have entertained the idea (Williams among them) that the noise is

*By Mr. O. Navez, Veterinary School of Belgium. *Annales of Veterinary Medicine*, Jan., Feb., March and April, 1919.

caused by inflation of the laryngeal ventricle by the inspired air. No one before Navez has ever endeavored to confirm these ideas; they were simply accepted as being sufficiently explanatory. In this series of observations this author shows by experiments on the fresh carcass, on newly dissected specimens and by endolaryngoscopic examinations that neither of these two ideas are correct. He shows that inspired air is incapable of drawing the vapid arytenoid into an obstructing position and that inflation of the ventricle is the wildest flight of imagination. It never occurs under any circumstance *in vivo* and can not be artificially produced on the fresh cadaver or dissected specimen no matter how powerful an air current is driven through the prepared larynx.

The general conclusions of this long article are as follows:

1. It is an error to imagine that inflation of the ventricle sufficient to seriously encroach upon the lumen of the larynx ever occurs. Laryngoscopy while the subject is in the dyspneic state proves there is no inflation present. The author's claim is further confirmed by his failure to produce this phenomenon by driving forcible air currents through prepared specimens.

2. Thoracic aspiration alone is incapable of displacing the arytenoid and vocal cord sufficiently to produce dyspnea and roaring. The intervention of another active factor—spasm—is essential. The constriction is due to spasm of the incompletely paralyzed muscles of the affected side, or in complete paralysis, those of the opposite side.

3. It is at the level of the glottis that the narrowing occurs and that the dyspnea and roaring have their origin.

4. Horses, especially of the draft type, are often affected with laryngeal hemiplegia without exhibiting any symptoms of roaring. Dyspnea without roaring, in draft horses, may be caused by laryngeal hemiplegia and the diagnosis may be confirmed by laryngoscopic examinations.

5. In draft horses William's operation is more effectual if the connective tissue surrounding the pouch is delacerated and when the paralysis is incomplete recurrent laryngeal neurotomy is helpful by assuring a perfect fixation of the arytenoid cartilage.

6. The paralysis is not of central origin as has been suspected by some. It is an amyotrophy of nervous origin but the nervous lesion is motor and not trophic. The recurrent nerve of the affected side in all of the researches was found to be altered (in proportion to the degree of paralysis) as far as the level of the aorta. Above this level it was found sound. The muscle lesion (the atrophy) also disproves the theory of central-trophic origin of the amyotrophy. The atrophy is a simple atrophy never exhibiting any fiber degeneration as would be the case if the trouble were trophic in origin. In short the examinations of the muscles of all kinds of cases shows that the paralysis is motor-paralysis of disuse. The lesion of the nerve itself is sometimes a neuritis and other times a traumatism caused by aortic pulsations.

Comment:—These recorded facts born of such a long series of carefully planned and executed experiments and researches should at once close all our controversies about the etiology of laryngeal hemiplegia. Those who have sought to cloud the cause in the mysteries of central trophic lesion may now yield to the proven and plausible explanation. Our researches reported in a paper before the American Veterinary Medical Association (1913) attribute laryngeal hemiplegia to interstitial neuritis caused by inflammatory thoracic affliction and to traumatism of the recurrent nerve at the point it encircles the aorta. The former we explained caused all the cases of roaring that follow diseases such as pneumonia, influenza, etc., and the latter those occurring in the hard worked horse that develops the disease independent of any inflammatory affliction. The thumping pulsations of the aorta against the recurrent nerve in the runner, hunter, trotter, pacer and hard worked drafter very nicely explain the cause of many roarers which heretofore were thought to be victims of mysterious central nervous lesions or of the still more mysterious influence-heredity. It remained for some one to demonstrate the difference between muscular degeneration of purely trophic origin and one of simple disuse from motor paralysis to

prove that in roaring we are dealing with the latter. Navez has done this and we thank him.—L. A. M.

ASPIRATION VERSUS LANCING OF SEROUS SACS OF HORSES' SHOULDERS

The serous sacs of the shoulders of young horses are well known to all country practitioners. They consist of submuscular collections of a lymphoid liquid along the lower part of the collar seat. They vary in size and fullness, some being small and somewhat circumscribed, others extending from the level of the shoulder-joint to the middle third of the scapula. Some are flabby, indicating only a limited amount of liquid content, while others are full and tense. In every case they are serious and they disable the affected subject for hard work and often cause much pain when work is insisted upon. The usual course of treatment has been lancing followed by drainage and irrigation with various antiseptics. Many practitioners have adopted the plan of packing them with a wadding after evacuation of the contents by lancing, others prefer wadding of the orifice only to prevent the lips of the wound from closing together and the free exit of the liquid that continues to exude for some days after lancing. Still others prefer evacuation with a trocar and canula as often as the liquid re-accumulates.

The writer has recently had a case affecting both shoulders. Since both shoulders were affected similarly in every respect it was thought a very good opportunity to test the merits of two standard interventions. One was lanced and the other aspirated, both under aseptic precautions. As the subject was given over to the owner for after-treatment the lanced one, of course, suppurated and developed during the healing a very hard ridge extending along the entire region of the sac. Once during the healing it was found necessary to reopen the orifice by forcing a sound into it. This evacuated a considerable amount of pus that had collected while the orifice had been closed. The shoulder that was aspirated re-filled on the third day, at which time it was again evacuated with a trocar and canula. Ten days after the first operation this shoulder was ready for the collar. The lanced shoulder was still sensitive after three weeks and the seat of lancing was not completely closed. There was still a hard knob the size of a walnut around the lance wound and a short line of protruding granulations which still forbade seating a collar with safety. In four weeks it was well, however. The aspirated shoulder was ready for the collar eighteen days before the lanced one.—L. A. M.

ACUTE METEORISM OF RUMINANTS

Mr. A. Delmer, assistant professor in the National Veterinary College of Alfort,[1] reviews the classical etiological factors and seeks to present the important points of the pathogenesis that would suggest a rational treatment. The gases which inflate the rumen are caused by fermentations produced by anaerobic microorganisms, the chief one being the Bacillus amylobacter of Van Tieghem. This organism, acting with others of similar species, is capable of producing a rapid decomposition of succulent alimentary materials. The decomposition yields acids and gases. Of the former, butyric acid predominates and remains in solution in the liquid contents of the rumen. The chief gases are CO_2, H_2, and CH_4. These accumulate in the superior part of the organ. The usual preference of surgical interventions is that of puncturing the rumen with a trocar of medium caliber and of giving antiseptics to control the fermentation. These are found objectionable. The trocar, in order to prevent re-accumulation of gases, must be left in twelve or more hours to the end of inviting abscess and peritonitis, and intensive medication is harmful, since it contributes to the condemnation of the meat should slaughter be found advisable as a conservation measure.

The author's procedure of choice is the instillation of one to two liters of hydrogen peroxid through the canula after the gas has been evacuated. The medicament is heated to a temperature of from 25° to 30° Centigrade. The oxygen disengaged in contact with the diastases and peroxydiastases of the vegetable tissue is very toxic to anaerobes and at the same time it also exerts a beneficial influence on the motricity of the rumen. The usual means

[1] *Recueil veterinaire*, 1918, *p.* 225.

of producing stimulation of the walls of the rumen should not, however, be abandoned as an additional measure.—L. A. M.

JUST A WHINE

Editors of technical or professional literature are confronted with demands from two groups. The one wants practical matter while the other thirsts for the more intellectual ration. The one is apparently satisfied with the world's knowledge and seeks only to exploit what he can of it for his personal welfare, while the other has ambitions toward higher achievements by blazing into the unsolved mysteries of the sciences concerned, and besides enjoys the mental stimulation derived from the better class of productions.

Current literature would be a much more influential factor in directing the trend of human endeavor if it were not for the fact that the cherished ideals of editors must yield to popular demands. Thus, in the lay press, uplifting topics are always relegated to the obscure columns while the basest of human acts are glaringly headlined on the front page. No one would doubt that civilization would feel the beneficial influence if this order were reversed, but it is not done because the public wants it so. The human animal seems to find it easier to descend a scale than to mount up a peg or two and thus allows itself to be entertained with literature that drags downward. Legions of pleased readers are, therefore, not always an indication of an upward trend, in fact, a horde of dissatisfied ones may actually indicate the contrary.—L. A. M.

DESNOUNTING PIGS

In lieu of ringing, hogs may be prevented from rooting by simply removing the rim of the snout down to the level of the nose. The operation is performed at weaning time and is done with a pair of sharp curved scissors with little difficulty. There is nothing much more annoying than a rooting pig, and in view of the fact that lost rings are never noticed until damage has been wrought and that repeated ringing is a nuisance, this operation should become popular, and when done in connection with castration it is well worth the visit of the veterinarian, to the owner of hogs who usually does these operations himself. If there are any harmful consequences its practice on a large scale will develop them. From a small experience no untoward results or inconvenience to the pigs have thus far appeared, and its success in preventing rooting has been satisfactory. For fear of being reminded that the operation was known to the ancient Egyptians, the writer is not claiming priority.—L. A. M.

MIXTURE NOT SOLUBLE

I made up twenty-five gallons of Dr. Merillat's fly oil, as per the prescription in the July issue of the Journal, and the oil will not stay mixed with the soap and water. How can a permanent emulsion be made of this solution? This would be a good seller if it would stay mixed, but it mixed very little better than oil and water. —T. B. T., Mo.

REPLY: Shake the bottle and apply as directed. The mixture is not a soluble one. With some grades of crude oil the solubility of the ingredients is better than with others but permanent emulsification does not occur with any we have yet tried. As a fly repellent however, it is no less effectual because of this objection.—L. A. M.

REMOVAL OF SPLINTS NOT ADVISABLE

I would like to have you suggest to me some practical method of removing a bad splint, that is, one that shows up very prominently.—G. W. J., Ill.

REPLY: Splints usually recede as an animal grows older and absorbent applications often receive credit not due them, hence it would be far fetched to claim much for them in effecting a removal. Our best treatment has always been repeated applications of mercuric iodid ointment about one to eight. We have tried chiseling off of large splints, but the results were never satisfactory even when there were no wound complications to blame. The tendency of bone cells to proliferate and produce new bone in this region seems too great to hazard this radical measure. Our cases were always left with blemishes more unsightly than the splints that preceded them.—L. A. M.

DEPARTMENT OF

SWINE PRACTICE

Edited by A. T. KINSLEY, M. Sc., D. V. S.

The Swine Situation

ACCORDING to reports, the number of swine in the United States was at least five per cent less on July 1st, 1920, than on January 1st, 1920. The apparent reason for the decrease in the number of swine was the diminished number of pigs farrowed the past spring combined with an increased loss of small pigs. In 1919 there were approximately 75,000,000 swine produced in the United States. Unless the 1920 fall crop of pigs is above the normal and the usual losses of small pigs and other swine are materially diminished, the total number of swine in the United States in 1920 probably will not exceed 65,000,000, and there will be a shortage in swine and pork products in the near future, providing there is no material change in the foreign demands.

From present indications the 1920 fall pig crop will not be in excess of the normal crop and will probably be less than normal because many breeders were discouraged with the small spring pig crop and have, or are fattening their brood sows. The weather conditions throughout the corn belt has not been the most favorable for farrowing during the last of August and first of September, because of the excessive amount of rain and, if the wet, damp, chilly weather continues, the loss of the fall farrowed pigs will be excessive, unless proper precautions are taken to protect the young pigs.

The Veterinarian's Duty

The veterinarian has served his clients admirably under the existing circumstances, but has been bewildered by statements, that were at variance, from the supposed authorities on swine diseases. Certain fundamental facts regarding swine diseases are now apparently accepted, and an understanding of them we believe forms the foundation for the control of swine diseases. The veterinarian is interested and concerned in the welfare of his clients and it seems possible that by concerted effort the losses in swine can be reduced to a minimum.

The following general classification of the diseases and conditions that are responsible for the loss of swine, when fully comprehended, will be of material assistance in the relief of disease and the prevention of losses in swine.

First, the loss of pigs is due to animal parasites, cholera, swine plague, scour and abortion.

The losses of pigs due to animal parasites are much larger than is usually suspected. From reports and investigations it seems very probable that at least ten per cent of the 1920 spring pig crop was destroyed by animal parasites. Pulmonary ascaridiasis is very prevalent and has been responsible for the majority of losses due to animal parasites in little pigs. It is caused by the larval form of the ascarid which invades the lung tissue and produces a bronchopneumonia. The extent of the disease, generally speaking, varies with the number of larvae invading the lung. The source of infestation is variable, but in general it may be said that the ova or embryos occur wherever the fecal discharges of swine affected with intestinal ascaridiasis are found.

Symptoms manifested as a result of larval ascarid invasion of the lung consist of unthriftiness, staring coat, rapid breathing, thumps and in the later stages there will be inappetence and probably diarrhea. The symptoms are not sufficiently distinctive to base a positive diag-

nosis upon. However, the history is of value, for this condition will be more or less prevalent in pigs farrowed by sows that are infested with adult ascarids and also in pigs that have access to hog lots that have not been kept in a sanitary condition or have been used for hog lots for several successive years.

Lesions found in pigs dead of pulmonary ascaridiasis consist of an embolic pneumonia or small broncho-pneumonic centers in various parts of the lung. The related bronchial lymph-glands in cases of pulmonary ascaridiasis are not hemorrhagic nor hyperemic.

Prevention: Ascaridiasis in pigs is easily and effectually prevented by elimination of the intestinal ascarids from the sows, dipping and placing the animals on ground or in lots not previously used for swine prior to the time of farrowing. Every practitioner and other veterinarians can be of real service to their clients by suggesting and executing this simple line of preventive treatment.

Treatment: We have observed one litter of pigs successfully treated that were said to be affected with pulmonary ascaridiasis. The treatment consisted of inhalation medication, using eucalyptol oil. The pigs were confined in a crate for this treatment and were required to inhale the medicated vapors for about fifteen minutes and the treatment was repeated daily for two or three days. The vapor medication increased the fluidity of the bronchial secretions and apparently facilitated the discharge of the parasites. This line of treatment can be applied to a large number of pigs placed in a reasonably air-tight hog house or box.

Cholera Losses Preventable

Loss of pigs due to cholera can absolutely be prevented by the use of anti-hog cholera serum. It is a well recognized fact that some suckling pigs have sufficient resistance that they do not contract cholera, but on the other hand it has been positively demonstrated that some suckling pigs die of cholera and, therefore, we believe it is incumbent upon veterinarians to prevent the losses of suckling pigs from cholera by proper and prompt immunization. The Bureau of Animal Industry recently published results of experiments indicating the possibility of producing a permanent immunity in suckling pigs by the simultaneous method, but it is possible that there may be conditions existing in other sections of the country that would prevent the production of a permanent immunity in suckling pigs.

Swine plague is a factor that must not be overlooked. A concise description of this disease has been published previously.

Sanitation Lessens Losses From Scour

The loss of suckling pigs due to scour varies in different sections of the country. Scour may be of dietary origin or it may be caused by bacterial infection or parasitic invasion. From the nature of the disease in suckling pigs it seems probable that scour is more commonly of bacterial origin. Proper sanitation will prevent a large portion of the losses caused by bacterial scour. In accordance with the well established principles, it is probable that immunity can be produced in pigs that will protect them against the bacteria that produce scour. Sanitation combined with proper immunization has resulted in reducing the losses due to scour to a minimum.

Abortion in swine is a relatively new factor. This disease has not yet been identified as being specific. It is possible that the abortions occurring in 1919 and 1920 were due to a variety of microorganisms, such as the B. suipestifer, B. suisepticus, colon bacillus and various pyogenic cocci, for some veteranians report that they could apparently control the disease by immunization of sows at breeding time or soon thereafter, with a bacterin made from the aforementioned bacteria.

The other losses in swine, in addition to those previously described that affect suckling pigs, are primarily due to hog cholera, swine plague and infectious necrotic enteritis.

Hog cholera is the most important disease of swine for it is responsible for the largest percentage of losses in shotes and adult swine. The recognition of hog cholera, generally speaking, is not difficult if the history of the case is carefully considered in conjunction with the symptoms and postmortem findings.

The history if accurately obtained, reveals a source of infection and a rela-

tively certain period of incubation of from five to seven days after which the disease in susceptible swine appears to affect almost all if not the entire herd simultaneously.

Swine plague outbreaks may or may not have an apparent source of infection. There is a variable period of incubation, usually a relatively small portion of the herd becoming affected in the beginning. This disease runs a rapid course and the percentage of fatalities is less than in cholera. The symptoms of swine plague vary according to the type of the disease and are not of much diagnostic value.

Infectious Necrotic Enteritis Slow of Onset

Infectious necrotic enteritis is a condition characterized by digestive derangements and an associated enteritis. The intensity of this disease varies probably in direct ratio with the intensity of the inflammation. This disease spreads in a herd less rapidly than either cholera or swine plague, and is usually of a subacute or chronic character. The principal symptom is persistent diarrhea. The affected animal soon becomes gaunt and rapidly loses flesh. In some herds the disease is extensively fatal, while in other herds there is a small percentage of fatalities. This disease can usually be readily diagnosed by the fact that it has rather a slow onset, spreads relatively slowly in a herd, the pronounced symptom being diarrhea and the lesion consists of an enteritis in which there is an adherent exudate.

If the diseases causing the principal losses of swine are classified as herein indicated, it would seem that they could be more clearly comprehended and the losses materially reduced.

Queries and Answers

RACHITIS DUE TO INTERMITTENT LUXATION OF PATELLA

I was called to one of my clients recently to see a two-year old colt that was suffering from extreme weakness. The client told me that he had brought the colt from a pasture where it had been since early in the summer, and he was not aware that there was anything wrong with the colt until he went to get him.

He seems to have no use of his hind parts. When I attempt to move him, his hind legs seem to be glued to the ground, but after a time, he manages to move them and can then walk some. He is able to get up after being down, but with difficulty.

He eats well, bowels and urine in good condition, temperature 101.6°, pulse 37, and respiration normal, except during attempts to move about.

This is all the history that I am able to state. There is no fracture of the pelvis. Will you kindly advise me what your diagnosis of this would be and treatment?

REPLY: By exclusion, the diagnosis seems to simmer down to two probable ailments; parasitism, more likely invasion of filaria immitis or strongylus armatus, or rachitis.

The filaria might cause the thrombosis in the colic artery which leads to emaciation. Later, thrombosis might occur in the iliac artery and account for the great weakness in the hind legs and the difficulty of locomotion. The condition, however, should be persistent and not intermittent as you describe.

Rachitis forms the most likely diagnosis for your case. If this is correct, the condition you describe in the hind legs is due to intermittent luxation of the patella. This is an important factor in rickets in colts and in certain breeds of dogs.

Treatment is likely to be of no avail if the trouble is due to the filaria. If it is due to other parasites, such parasiticides as are indicated should be given.

If the trouble is rickets, the diet should consist of food rich in mineral matters

such as the best of oats, good corn, crushed if necessary at the time of feeding, bran, timothy hay and alfalfa. Give two dram doses of phosphate of lime, mixed with the feed, three times daily. If the cold is anemic, add one to two drams of phosphate of iron, three times daily.

Fruit acids are of value in this disease, and in the horse, we recommend the addition of apples to his regimen.

Recovery may be hastened by the addition of about 30 grains of desiccated thyroids administered three times daily. As this is somewhat expensive, potassium iodid, say 20 grains, three times daily, might be used instead, with advantage. The thyroidin and the iodid promote metabolism and facilitate the absorption and assimilation of the necesary mineral matter from the food and medicine.—E. L. Q.

A SUBMAXILLARY EDEMA IN COWS

I have been confronted with several cases of a very similar nature, the diagnosis of which I presume would be very easy if one only knew. I am unable to find a satisfactory explanation in reference books so I am relying upon you to assist me.

The predominating symptom is a very edematous swelling in the submaxillary region. This includes the entire space beneath and around the lower jaw. In some cases, this swelling involved the parotid glands and in one case, the brisket and even under the abdomen was swollen. Sometimes, there is a slight elevation of temperature and increased respiration. Anorexia is also present. So far I have had only one cow in a herd affected, and the majority of the cases die. These cases develop very slowly. One case was noticed to be off for almost two weeks before the swellings occurred. I have blistered them, etc., but after a seeming rally, they linger on a while and die.

A positive diagnosis and outline of treatment would be greatly appreciated.—B. U. H., Wisconsin.

REPLY: From the meager description, we are inclined to believe that you are dealing with traumatic pericarditis. We would suggest that at your first opportunity you make a thorough postmortem examination, which evidently you have failed to do, and we would be pleased to have a report of your findings.

If it is traumatic pericarditis, treatment is of no avail. Should, however, these cases prove other than pericarditis, it would appear that they may be due to an infection, and we would suggest the administration of sodium cacodylate in forty-five grain doses, dissolved in one ounce of water, subcutaneously, and repeated every three or four days. Stimulants, especially stimulating dietetics, are also indicated on account of the edema which may interfere somewhat with respiration.

Some information as to the age of the animals affected, and as to whether there were digestive disturbances would aid in arriving at a diagnosis.—E. L. Q.

HYDROCELE INDICATED

I have a case for operation that I am unable to diagnose and I trust you will be able to help me out. A description of the case as I saw it with the history is as follows:

The patient, a bay gelding, three years old, weight 1,650 pounds, soft swelling in the scrotum, was castrated when a yearling and about six to eight months afterward the owner noticed a small enlargement in the scrotum, which continued getting larger until it is at present the size of a goose egg. This swelling feels soft and reducible and after a day's work it almost entirely disappears, but the next morning it is about the same as before. It has been the same size for about a year. The gelding had "navel ill" when one week old.

I am unable to determine whether it is a scrotal hernia or water seed (hydrocele), and I hope you will be able to help me in making a correct diagnosis.—J. E. M., Ohio.

REPLY: I can make nothing out of the case you describe other than hydrocele or "water seed." If, by any chance, this were a hernia, small as it is, it would be somewhat larger and much firmer when the animal was pulling hard, and it might be well to make this examination.

Further, the insertion of a sterilized hypodermic needle and squeezing out

some of the fluid might help in the diagnosis. If it is hydrocele, the fluid will be straw-colored and almost odorless. If it is hernia, the fluid will be similar to liquid intestinal contents.

BLACKTONGUE OR NECROTIC STOMATITIS IN NORTHERN OHIO

I note by the veterinary journals that this dreadful dog malady is supposed to be confined to the south, but I have seen it here in Melina County, Ohio, in the last two years, both in native bred dogs and in southern fox hounds, which had been here a year or more before coming down with the disease.

The disease we have here answers in every way to the description given under canine typhus, by Hutyra and Marek, also to the prescription given by all southern veterinarians of southern canine plague and black tongue.

The cases here are all alike, except that some will live longer than others, the course of the disease varying from thirty-six hours to ten days.

It is supposed to be an infectious disease, but I have seen it in a dog which did not come in contact with other dogs, at all. On the other hand, two of four fox hounds on the same premises have died with it. They were kept in separate kennels three or four rods apart. When the first one got sick, one of the three, a Georgia fox hound, was taken to another place, one-half mile away, given a change of food, yet she came down with the disease in two weeks. I managed to save her, but she did not have as severe mouth lesions as the other two, and she was a young dog.

I wish someone who has had a good deal of experience with this disease would write, through the JOURNAL, and tell what they know of treatment, prevention, etc. —V. E. S., Ohio.

REPLY: Discussion of this disease in the JOURNAL dates back more than ten years. Considerable attention has been given to it lately. The writer of the foregoing has drawn a wrong conclusion from these articles. They have not indicated that the disease occurs only in the south, but that it was first recognized there. It has been as prevalent in Chicago during the past ten years, as anywhere else in the United States. It has been reported as occurring in Duluth, which is far from the south.

The statement in the foregoing that one of the animals affected was a young dog is so unusual as to raise a question as to the diagnosis, or rather, this condition would be unusual in Chicago, where the animals affected have been invariably mature dogs, and so far as has been reported, more than four years of age.

This disease occurs in a subacute, acute and peracute form. The subacute form is amenable to treatment in most instances. The acute form may yield to treatment if the case is treated during the first twenty-four hours. The peracute cases are invariably fatal, as they frequently die within thirty-six and often within twenty-four hours, even before any pathological lesions may occur, death being due to acute septicemia.

The means of transmission of this disease is not well understood. The writer is of the opinion that the virus or germ may be conveyed through the medium of dog lice or dog fleas. We have personally experimented by putting a dog afflicted with the disease in a most severe manner, in a small kennel with a well dog, and have repeatedly failed to convey the disease. In this opinion regarding the transmission of the disease, we are borne out by the quite recent discovery of the manner and method in which typhus of the human being is conveyed; i. e., through the intervention of the human body lice.

The treatment we have found most successful, but only if instituted during the first twenty-four or thirty-six hours of the attack, is to administer a large dose of sodium cacodylate hypodermatically, which means, say to a twenty or twenty-five pound dog, we give as high as 5 to 10 grains at one dose, repeating in about three days with a three to five grain dose according to developments of the case.

In addition to this we give the animal:

Rx Hydrarg. Chlor. Mitis ..... Gr. j
Quin. Sulph. ..... Gr. vj
Phenyl Salicyl. ..... Gr. xx
M. et div. in Caps, No. viii
Sig.—One capsule every four hours.

Or, in the subacute form, the following may be used:

Rx Iodi pulv. .....Gr. j
Petrolati liq. .....℥ iij
M. Ft. Sol.
Sig.—One teaspoonful every three or four hours.

If the eyes are affected, use a two-percent yellow oxide of mercury ophthalmic ointment instilled under the lids, gently massaging the lids to spread the ointment. Do this twice daily.

During the illness and for several days afterward, the diet should be restricted to milk, diluted with about one-eighth part of lime water. Later on, this may be augmented by the addition of an egg beaten up, and given about twice during the day. Solid food should not be allowed until about a week following recovery.

In case a tonic is needed, use the saccharated carbonate of iron in two to five-grain doses, three times daily. In those cases that emerge from their illness very much emaciated, we build them up more rapidly by the hypodermatic administration daily of an ampoule of iron citrate and arsenic.—E. L. Q.

ATTACK OF ACUTE BULBAR PARALYSIS

Having many times acquired much valuable information from case reports in the Journal, I decided to submit to you a report of a case that recently came under my observation, and that I do not thoroughly understand.

The subject was a six-year-old, black mare, weighing about 1300 pounds, and in good condition. The history was that she had eaten her feed until noon of the day when I was called, but had not been as eager for it that morning as usual. For the last two days she had been drawing hay from the field to the barn; pulling very hard at times. During part of the forenoon of the day I was called, she had worked on a two-horse, wheel cultivator, but was a bit logy, and staggered quite noticeably, becoming weaker and more unsteady the longer she worked. Soon after she was stabled at noon she urinated, and the attendant could see nothing abnormal in the urine or the manner of voiding it. A few minutes later, she was found lying down, and after several attempts were made to get her up, it was found necessary to remove her to the barn floor by use of ropes and in the recumbent position.

When I arrived, she made several attempts to arise, but had almost no control of her hind legs, her maneuvers closely simulating those of a horse down with azoturia. Temperature was 102° F., heart but slightly accelerated, and respiration rapid or nearly normal, except when struggling. Expiration seemed to require especial effort, and the entire respiration was somewhat shortened. The animal was rather nervous and made several attempts to rise.

She was kept under observation for about three-fourths of an hour, and a diagnosis withheld. She died with but little struggling. Shortly before she died, I administered an aloes-ball, and gave several dose-syringes of water to rinse it down. A few minutes later, I gave a two-ounce capsule of turpentine containing a small quantity of Peruvian balsam. This, I likewise followed with water from a dose-syringe but it did not seem to go down; so I poured some water in her mouth from a bottle but she seemed unable to swallow, so I attempted to force the capsule along with the aid of a stomach tube. She refused to swallow the tube and fought desperately against it. I had withdrawn the tube only a few minutes when she died.

On autopsy, the aloes-ball was found in the posterior pharynx, and the capsule of turpentine had apparently dissolved, part of the contents going down the trachea and part going down the esophagus. No derangement could be found along the alimentary canal, liver, kidneys, spleen or heart and lungs, or bladder or genitalia; neither was there any evidence of myositis in the gluteal muscles.

Examination of the hay and grain such as this animal had been getting showed them to be in good condition. She had been fed six quarts of corn and oat chop three times a day, and was driven by a careful and trusty attendant.

A diagnosis and the cause of this ailment is requested.—C. F. B., Pa.

REPLY: Your case is a rare one, and after careful study of it, we are quite sure it is one of acute bulbar myelitis.

The predominant symptoms of bulbar

myelitis or bulbar paralysis, as it is also termed, is demonstrated by paralysis of deglutination, facial paralysis, ptosis, etc. Osler's Modern Medicine, page 635, volume 7, says: ". . . a tendency of the symptoms to descend possibly beginning with ophthalmoplegia, going on with bulbar symptoms, and ending with limb disorders has been noted. There is great irregularity in the degree to which the various portions of the involved apparatus are diseased."

Treatment in the acute type of this disease is of no avail.—E. L. Q.

A PECULIAR CASE OF PARTURITION

July 13th, I was called to see a grade cow. I found she had a temperature of 103° F., pulse and respiration normal. On the left side there was a slight fullness in the flank, of a doughy consistency, which remained sunken after removal of the hand.

I made a diagnosis of impaction and administered a physic. She was turned out to pasture, and the owner said he thought the physic was effectual. I was called again on July 17th, and found the temperature normal, but the animal had a gaunt appearance. Upon arising, she attempted to defecate but was unable to do so. By means of a warm soapsuds rectal injection, some very hard feces covered with mucus were removed. The next evening when I called the cathartic had acted nicely, and the cow seemed better, and had drunk about three gallons of water.

That same night she gave birth to a live, apparently mature calf, although her appearance had not indicated that she would calve for at least two months. She had "made no bag," nor did she look as though she were carrying a calf at all. However, the owner had said that she was due to calve any time. I had made an examination of the reproductive organs and found the uterus closed and sealed and had told the owner that I did not believe she would calve before two months.

After the calf was born the owner went away, and when he returned at night, he found the cow's uterus everted and in very bad condition, so he killed her.

What puzzled me in the case was that the cow showed no signs of calving and did not look as though carrying a calf.

Should I have treated this case differently, or has any one else had a similar case?—W. A. A., Kan.

REPLY: We agree with your diagnosis, but think that parturition was precipitated as a result of the purgatives and the debility occasioned by the cow's illness.

In the administration of cathartics to pregnant animals, purgatives such as croton oil and other similar irritating drugs should not be used. It is best to depend on hydropathic treatment and the administration of linseed oil, or better still, liquid petrolatum in liberal quantities.—E. L. Q.

OBSCURE AILMENT IN SHEEP

I have a client who is losing his sheep. Three died before I was called and three have died since. About the only symptoms that they show are cough, sneezing and a discharge from the nose. They live only from two to four days after taken sick. Occasionally one recovers.

The day I went out to see them, one was sick, showing the symptoms mentioned. He was also paralyzed in the posterior parts, but the owner stated that the others were not affected in this way. The temperature of this one was 101°.

I held an autopsy on one that had died the day before, but the findings were of no value. However, although the organs were decomposed quite badly, I should say that the lungs were normal, also the intestinal organs. The kidneys and liver were quite friable and of a brownish color, but this may have been due to the length of time the animal had been dead.

I suspected worms in the sinuses of the head but was unable to detect any. I did not hold a very thorough examination on account of the strong odor present. I tried to have my client change the pasture but he said he had no other place to turn them.

I shall appreciate any information on this matter that you may be able to give me.—P. F. S., Wis.

REPLY: Unless your client can change pasture, the chances are that more trouble will ensue. A change of feed or pasture is the first thing to do in an obscure case like this. Immunizing with

hemorrhagic septicemia bacterin; the hypodermic administration of sterile camphorated oil; a lick kept in a dry place, composed of salt 100 parts, iron sulphate 7, sulphur 2 and ginger 1, will be as good treatment as one can suggest in general.

If another animal becomes sick, and it is not too valuable, cut its throat and perform a thorough autopsy, sending any suspected organs to the nearest bacteriological laboratory.—E. T. B.

INFORMATION ON ANIMAL DENTISTRY

I would like to see in the Journal, a general discussion on the subject of animal dentistry, a series of articles dealing with the entire field of veterinary dental practice.—C. A. D., Georgia.

REPLY: A discussion such as you desire is more within the realm of the textbook than of a periodical. It is not likely that a long series of articles on the fundamentals of dentistry would prove widely interesting. We would recommend you to procure a copy of Merillat's Animal Dentistry, the price of which is $3.00. It will give you the information asked for above, carefully prepared and in a permanent form.

Individual problems which you do not find solved therein or special cases that puzzle you, we shall be glad to discuss in these columns on receipt of your inquiries.—E. L. Q.

NOT LEAD POISONING

Sometime ago I was called to post a yearling steer that the owner claimed had died from "red lead" poisoning.

The yearling had been dead eighteen or twenty hours and I could find nothing that would indicate poisoning of any kind.

He is supposed to have injected the lead about a week before death. I claimed that if he had been poisoned he would have shown diarrhea after a few hours; whereas there was none. Am I correct?—D. S., Tex.

REPLY: I remember having seen only one or two cases of lead poisoning, and in both of these there was constipation rather than diarrhea. I note that toxicologists coincide in this view. For instance, Landers gives the symptoms of lead poisoning:

"Acute: Intense abdominal pain, grinding of teeth, nasal discharge, salivation, pallor of mucous membranes, constipation, hard black feces, fetid breath, ropy urine.

"Subacute: Listlessness, watery discharges from the nose, bright prominent eyes, tongue red, feces hard, urine highly colored and ropy.

"Chronic: Blue line on gums, colic, constipation alternating with diarrhea, thirst, paralysis, convulsions, coma, debility and emaciation."

Both Holland and Winslow give similar symptoms, though not in such detail. Both mention constipation as being a symptom of all forms of lead poisoning. Landers alone mentions diarrhea.

PAPILLOMATOSIS YIELDS TO ARSENIC

Please give treatment for warts, especially where they occur in considerable numbers.—R. C. B., Iowa.

REPLY: Administer Fowler's solution of arsenic internally in fairly large doses. For two-year-old colts, 3 or 4 drams mixed with the feed or drinking water, three times daily. For the adult horse, 6 drams, three times daily. For cattle, one ounce three times daily. For dogs, 4 to 8 minims, three times daily.

At the same time apply by means of an absorbent cotton swab, full strength Fowler's solution to the warts several times daily, the more frequently the better.

The above treatment is also successful in the eradication of that peculiar form of warts in cattle which, instead of being papillated like the usual wart, occur as rounded, smooth elevations.—E. L. Q.

"WOODEN TONGUE" IN A BULL

I have under treatment, a case of actinomycosis of the tongue in a two-year-old bull, and would appreciate suggestions as to treatment.—R. C. B., Iowa.

REPLY: Actinomycosis of the tongue is treated medicinally the same as actinomycosis affecting any other part of the body, i. e., by the administration of iodid of potash. For cattle, give dram doses twice daily.—E. L. Q.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

Importance of Veterinary Parasitology

PARASITIC diseases of stock are commoner, more injurious and more important than they are commonly believed to be. In the United States alone, the annual loss from Texas fever in cattle, according to Mohler, has been $50,000,000, including the direct losses from disease and the indirect losses from inability to develop the live stock industry of the infected area as a result of the presence of the tick. Sheep scab was for many years the most important disease of sheep in this country. The total damage sustained as a result of stomach worms in sheep, ascarids in swine, palisade worms in horses, liver fluke, fringed tapeworm, screw worm, sheep tick, and other worm and arthropod pests, is said by the United States Bureau of Animal Industry to total many millions annually.

The more important of these parasites have received attention from the U. S. Department of Agriculture, and as the worst of them come under control, new lines of work on the less important ones are opened up.

The eradication of sheep scab is practically an accomplished fact and a tick-free South in the near future is aimed at, but the work of eradicating sheep tick and horse and cattle lice is just being developed.

Veterinarians have devoted too little attention to the treatment of parasitic diseases. For this situation the veterinarian is partly to blame, though there are other things that have aided in bringing it about. Veterinary colleges have not devoted enough attention to the subject of parasitology and there has been a scarcity of men qualified to teach this subject. Veterinarians have had too little acquaintance with some of the animals most subject to parasitic diseases, and many of them hesitate to attempt diagnosis and treatment of sheep and swine diseases. As a result, there has grown up among farmers and stockmen, the practice of treating their own stock for worms; resort is had to the veterinary columns of the farm papers for advice; stock tonics and preparations reputed to remove worms have had a large sale, and animal husbandmen and others have advocated so-called "mineral mixtures" for preventing worm infestation in swine. Regarding these mineral mixtures, it may be said that they may be of value to swine in furnishing mineral constituents or as appetizers, but critical tests indicate that they have no value in removing worms or preventing worm infestation.

That veterinarians have not devoted more time to treatment of parasitic diseases may be due in part to the fact that the group of substances used as anthelmintics has been a large, somewhat unsatisfactory hodge-podge of heterogeneous substances, the exact anthelmintic action of which had not been well studied. This is still true to a large extent. Nevertheless, the situation is improving in this respect and we are developing a body of facts with respect to the efficacy and dependability of, and the indications for, these drugs. The indications are that this group of drugs will be established on a certain and dependable basis unsurpassed by that of any group of

drugs. There is already evidence that parasitic diseases will receive more attention from now on and that practice along this line will be found highly satisfactory and profitable.

Washington, D. C. M. C. HALL.

SYMPTOMS OF PARASITISM

The clinical picture presented by diseases due to intestinal parasites, the sort for which most anthelmintic medication is intended, is characterized in general by three things: (1) An afebrile condition, with such rare exceptions as trichinosis, parasitism, as a result of the presence of worm parasites, is an afebrile condition, and this is characteristically true of gastro-intestinal parasitism. (2) Unthriftiness; animals commonly lose condition, become thin, a condition terminating in cachexia in severe cases, and show their lack of condition in their rough, staring, harsh coats. (3) Digestive disturbances; these commonly take the form of diarrhea or constipation, though such symptoms as emesis, blood in the feces, or gastro-intestinal catarrh may be present at times.

The symptoms of gastro-intestinal parasitism are most marked in the case of young animals, such as colts, calves, lambs, young pigs, puppies, kittens and chicks. In these animals the digestive tract is tender and as yet unaccustomed to the insult of irritation and trauma from worms, as it is also to the insult of coarse food, inert foreign bodies and similar things to which older animals are accustomed. Furthermore, there is a need for the highest possible degree of excellence in metabolic functioning if the young animal is to make its proper growth; the growing period is strictly limited and stunted growth due to malnutrition in the young cannot be made up during mature life. The undernourished young animal becomes the "runt", and to keep our stock free from these requires not only good breeding, good feeding and a certain amount of culling, but also freedom, or comparative freedom, from parasites in young animals. Parasites are injurious to older animals; they may at times, however, be tolerated so well that the infested animals show no symptoms, but infestations which will show little or no bad effects in older animals may prove fatal to young ones.

In this connection we may note the possibility that older animals have acquired a certain degree of immunity to such parasites, possibly an anti-toxin protection against the toxins which are produced by worms, which toxins, as already noted, may be merely the normal metabolic excretions and secretions of the worms. There is also the possibility that some worms may produce an immunity to attack, a thing which has some experimental demonstration for Schistosoma, but this is apparently not true of a number of parasites at least.

Washington, D. C. M. C. HALL.

GANGRENOUS LARYNGITIS IN A BOAR

Some time ago I was called to see a pure bred Poland China boar which had been purchased but three weeks previously for a neat sum. The boar was laboring under a very severe dyspnea which was slightly more marked on expiration than on inspiration. The dyspnea was so great that the animal could be heard breathing at a distance of 75 yards. Occasionally he would stop breathing for ten seconds only to again resume his rapid breathing. The temperature was 103°, pulse naturally accelerated. Auscultation of the lungs revealed nothing abnormal, the condition seemingly being in the larynx. This condition had prevailed three days, during which time the animal ate and drank frequently but very little at a time. The condition had grown but little worse since its onset. The boar had become so weak he could scarcely walk, lying down most of the time and when forced to rise would wobble from side to side.

Two veterinarians had already been called on the case. The first stated that he did not know what the trouble was; the second made a diagnosis of hemorrhagic septicemia and vaccinated 40 young pigs on the farm for this disease. I did not make a positive diagnosis but suggested that a foreign body might be lodged in the larynx or that an infection of the surrounding lymph-glands might have resulted in an enlargement of the glands and a constricture of the passage by pressure on the larynx. The owner was advised that additional treatment was inadvisable, due to the animal's weakened condition. The second

veterinarian had left a liquid preparation to be given every two hours which seemed to greatly relieve the patient.

The boar died in six days without showing any change and was immediately posted. Autopsy showed all the tissues and organs in the body apparently normal with the exception of the larynx, there being an area on the dorsal mucous membrane about the size of a dollar, and greatly inflamed. The mucous membrane was laid back disclosing a similar sized area beneath, which included the anterior dorsal portion of the cricoid cartilage and the base of the arytenoid cartilages, in which the cartilages were necrotic. The area appeared gangrenous and emitted a very foul odor. There was a very viscid, creamy material resembling pus, in the cavity, and the necrosed edges of the cartilages were tinged with green spots. Could this have been an infection resulting from a trauma by a foreign body? W. W. EMMEL.

Des Moines, Ia.

FURTHER OBSERVATIONS ON CESAREAN SECTION IN SOWS

I have received a number of inquiries concerning some details of the cesarean operation I described on page 404 of the August number of the Journal. I have answered some of the questions but I cannot send photographs to all inquirers. Kindly allow me the use of your veterinary Journal for a few more details and also to insert the illustration.

The percentage of recoveries amounts to more than 80, many having a few lacera-

The above photograph was taken seven days after the sow was delivered of seven pigs by laparotomy. All are thriving nicely.

tions and inflammation before operation. I am not slow to ask all the help I deem needed. Three men are enough. One man holds the front feet and has his knee on the sow's neck. One holds the hind feet. The third one hands me the water or the basin with instruments.

First the side is cleaned, washed and shaved. Then I administer the chloroform until the sow is well under. Then I rewash my hands and brush them. With one stroke of the knife I cut until close to the muscles, which are torn by hand. The peritoneum is cut with a scalpel and widened by hand. Then one horn is removed and laid over a clean cloth. The fetal membranes, if loose, are removed. If infected, the hands are washed with a brush before removing the second horn. No fetal liquid is allowed to enter the abdominal cavity. Lambert sutures are used. If any fat is in the way it is trimmed off. In a very few cases the vagina is flushed with a weak antiseptic solution on the third day.

S. J. ALCALAY.

Fairfax, Minn.

SOME OBSERVATIONS ON CANKER OF THE EAR IN RABBITS*

In Neumann's "Parasites" (second edition) it is stated that the rabbit's ear is subject to attacks from what are believed to be the same psoroptes as cause a form of mange in the horse, and parasites from the latter are illustrated in the section dealing with Psoroptic Otacariasis of the Rabbit.

That the rabbit usually suffers far more from ear parasites than is commonly supposed, everyone who makes a study of the subject will soon discover. Neumann's statement that canker of the ear was found in twenty-five per cent of individuals examined was certainly not an over estimation. Indeed, it is the exception in the present writer's experience to receive rabbits in summer time from other breeders which do not show signs of the trouble, if carefully searched for, although in the majority of cases the animals are quite well and healthy and do not appear to suffer any marked inconvenience from their uninvited guests. However, this is not always the case, and whereas a rabbit may have an ear half-filled with debris and seem not much the worse, in other cases inspection may reveal no obvious disorganization of the ear at all, yet the rabbit carries its head

*Veterinary Journal, London, 1920, Vol. LXVI. p. 86.

on one side, becomes thin and very ill and does not recover until its ears are treated for canker.

With the idea of completely freeing all our rabbits from canker, and acting on the assumption, advanced by veterinary experts, that canker is mainly, if not invariably, transmitted from rabbit to rabbit by more or less direct contact, a systematic dressing, at first daily, then every third day, and finally at longer intervals, was carried out throughout a small rabbitry for a year. Andre's liniment was used, applied with a camel's hair brush.

A beginning was made by systematically treating the ears of each doe and her litter from the time the young were about a month old. Such young as were reared for stock were treated at intervals throughout their life until they too bred and became the mothers of families. Hutches, nest boxes, etc., were thoroughly creosoted during the summer as opportunity occurred. At the end of a year, the rabbitry comprised one old stud buck which had shown signs of slight canker and had had his ears treated regularly and then at intervals; and several young bucks and does which had been treated systematically almost from birth. All the rabbits then occupied hutches which had either been creosoted or disinfected inside. Yet at the end of the year some of the rabbits were found upon examination to have a touch of canker in a few weeks after the regular treatment was stopped; and the progeny of these rabbits were likewise affected.

At intervals during the year, the debris from the rabbits' ears was microscopically examined and slides made showing eggs, larval forms and a third stage—generally considered, I believe, to be the adult stage—of a parasite. But no parasites corresponding exactly to Neumann's psoroptes were found. On the other hand, in every bad case of canker which has come under the writer's observation during the last fifteen years, in a rather bad case sent by a breeder last year, and recently in the ears of the old stud buck which was supposed to have had his "touch" of canker cured some months previous, parasites were found which were identified in Neumann (p. 104) as *Tyroglyphus longior.* The same parasite has also been hatched in great numbers in the summer without artificial heat in debris taken from a rabbit's ear and left for some days sealed down on a microscopic slide.

Were it not that so great an authority as Neumann has pronounced the rabbit's trouble to be due to *Psoroptes cuniculi,* I should hardly have hesitated, as a result of my own experiences, to attribute the complaint to *Tyroglyphus,* and I should go further and say that all the evidence obtainable points to the view that adult rabbits and young ones in the nest are perpetually becoming reinfected with this parasite from the hay which is given them to eat and make their nests of.

As rabbits seem to thrive in a most exceptional and remarkable manner when their ears are kept clear of parasites, it would be of interest to know if any suggestions can be offered as to a less laborious means of keeping down this trouble than treating perpetually in the manner already described.

C. J. DAVIES.

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY

The semi-annual meeting of the association was held at Asbury Park, N. J., at the Hotel Marlborough on Thursday and Friday, July 8-9, Pres. Robert E. Mosedale, presiding.

Hon. C. E. S. Hetrick, Mayor of Asbury Park, welcomed the association with a pleasant and sincere welcome. Dr. J. B. Hopper of Ridgewood, N. J., responded cleverly for the association.

The first speaker was W. Horace Hoskins, dean of the N. Y. State Vet. College at New York City, his theme being, "Some Future Problems of Veterinary Medicine."

The Dean, as is his custom, spoke extemporaneously and forcefully, regretting that some within the profession are not encouraging their sons and others to take up veterinary medicine; the cause apparently being due to the lessening of equine practice. While admitting that the trolley, the bicycle and the auto and tractor have in a measure replaced some types of horses, still he believes this to be a blessing in disguise, causing us to turn to a broader service. He believes that the question of land and food prob-

lems must play an important part in a permanent peace plan, and one that veterinarians must aid in solving. The control of tuberculosis is a matter of vital interest to the municipality, state and nation. This problem alone will require the services of thousands of able veterinarians.

Foot-and-mouth disease will ever need the watchful eye of the trained expert to keep it from our shores. He pleaded for strongly endowed schools, rather than for weak state schools, handicapped in many ways as most of them must be.

The next speaker was, Mr. Wm. E. Murphy, secretary of the Horse Association of America, who gave a splendid, logical talk on the usefulness of horse power, also, statistics to show that eighteen million horses and mules have been lying idle in this country while the frenzied purchasing of other motive power has gone on. He pointed out the sane progressive things the Horse Association of America is doing to bring to public notice the great and reliable value of horse power, inviting all veterinarians to join the association, and asking them to make it known that this association stands ready to circularize any community, spreading the gospel of horse power and aiding the horse and its allied interests in any way that it can.

Dr. B. F. King, one of New Jersey's oldest and much respected veterinarians and citizens, exhibited 26 calculi ranging in size from a large baseball to a hazel nut, that had been taken from the colon of his twelve-year-old driving mare. These calculi had not apparently given the mare any serious trouble with the exception of a couple of mild cases of colic, previous to the last one, which was severe and fatal.

"Tapeworm in Chickens," was the title of Dr. A. D. Goldhaft's paper, which appeared in the September issue. The subject of chickens discussed in a veterinary meeting in the East was an unusual thing and the interest in it likewise was unusual, as many who had before given the subject little if any thought saw at once the coming importance of a knowledge on the subject of poultry diseases, particularly in localities where raising poultry is an outstanding industry.

This paper was discussed by Dr. Wm. Herbert Lowe, who emphasized the great commercial value of poultry and poultry products. Dr. Eichhorn regretted that the study of this and other poultry contagions is not given more attention at veterinary institutions, as he considers poultry problems of tremendous importance.

Dr. "Tom" Smith cited an interesting experience as health officer, in being called upon to determine whether or not certain poultry were fit for human consumption.

Dr. Shaw spoke of the necessity of a veterinary pathologist at the State Experimental Station.

The next paper was by Dr. G. V. Sylvester, the title being, "Three inoculation Methods Against Hog Cholera." He discussed the advisability of using serum, virus, and mixed bacterins, simultaneously or otherwise. Most of the audience were of the opinion that this method is quite satisfactory, causing less breaks, but a few members related unpleasant experiences with mixed bacterins. The subject was discussed by Drs. Peterson, Hopper, Eichhorn and others, some attempting to point out the differential diagnosis in swine infections.

Dr. Eichhorn made the interesting statement that he had posted upwards of 3,000 virus hogs in the height of the disease, without yet obtaining sufficient constant lesions, that he could classify as specific of hog cholera.

The forenoon of the second day was given over to clinics at Dr. V. B. Height's hospital.

A bay gelding was at the hospital awaiting diagnosis. This proved an interesting case and was diagnosed by Dean Hoskins, as a low type of influenza with cardiac complications. Treatment advised was stimulants and tonics.

Oophorectomy on two sows and cesarean section on another one, were interesting subjects. Dr. P. F. Runyon of Freehold, N. J., performed the cesarean section in a neat practical manner, and Dr. John Peterson spayed by the flank operation. Dr. Peterson's method and instrument were quite unique. He pays but little attention to asepsis and the knife used, was used to scrape the rough-

er hairs off the skin and make the incision through the skin. The knife is very much like those used by harness makers, in cutting leather, with the exception that their blades are semi-circular while the blade of Dr. Peterson's instrument was more spade-shaped. Dr. Peterson cuts through the skin only, then breaks through the muscles with his fingers. It was really interesting to see the rapidity and skill with which the Doctor operated, notwithstanding that he has passed three score years.

The clinics being finished, the literary program was again taken up.

"Case Reports. Unusual Cases in Sterility," was the topic discussed by Dr. J. F. DeVine.

The last paper on the program was that of Dr. R. Hoff, of Newark, N. J., on "Tuberculosis Testing." Dr. Hoff deplored the fact that so many cattle owners in his locality were still ignorant of the merits of tuberculin testing, some still believing that tuberculin is capable of causing tuberculosis, and he believes that veterinarians should make greater effort to educate stock men on these questions.

J. F. DeVine.

SUNFLOWER SILAGE

Considerable interest has developed in various sections of the country during the past two or three years, in sunflowers as a silage crop. A number of farmers have grown sunflowers with corn and were well satisfied with the results, claiming that the yield was considerably increased and the feeding value was not impaired, but most of them were agreed that they preferred that the sunflowers should not make up more than one-third of the silage material. The claim is made, and quite generally accepted as a fact, that sunflowers will stand frost and drought better than corn and that they thrive better on light sandy soil. This would indicate that there might be a place for them as a silage crop in northern Michigan, where corn does not always mature, and especially on some of the areas of sandy soil, and to satisfy the many inquiries which were received along this line, the Dairy Husbandry Section of the Michigan Agricultural College at East Lansing undertook to secure some more definite data regarding the feeding value. Seed was sent out to a number of farmers in the northern part of the state in 1919 and careful estimates of yields on eight farms in Ogemaw, Grand Traverse, Otsego and Emmet counties showed that on an average the sunflowers yielded 20 per cent greater tonnage per acre than the corn grown in the same fields. At the Upper Peninsula Experiment Station at Chatham, a yield of 25 tons of sunflowers per acre was obtained.

TRIPLETS

The cow shown above gave birth to three calves on July 15th. The calves were all healthy, all about the same size, and color, two of them bulls and the other a heifer. Dr. C. B. Shore, of Maple Lake, Minn., who delivered them, is shown on the left. The owner of the animals is Mr. Tony Stump, Maple Lake, Minn.

On the College farm at East Lansing, a three-acre strip of sunflowers produced a 30 per cent greater tonnage than an equal area of corn adjacent. These sunflowers were put in one of the dairy barn silos with corn silage above and below and the silage fed out to the dairy herd during the winter. Sunflower silage is very dark-colored and has a strong odor and some of the cows refused it entirely on the start, while others ate it readily. As soon as they became accustomed to the sunflower silage they were fed the same amounts by weight as they had received of the corn silage. When the herd changed from corn silage to sunflower silage, a marked drop in milk-flow was apparent and the cows began to lose condition rapidly. The feeding of clear sunflower silage was continued for twelve days when it was thought best to make a change

and the balance of the sunflower silage was fed with an equal weight of corn silage, after which the herd was fed straight corn silage. The grain and hay ration remained the same throughout the different periods.

Milk-flow dropped 11.65 per cent during the seven-day period on sunflower silage but recovered noticeably when corn and sunflower silage were fed in equal parts, dropping again when the herd changed back to straight corn silage. In this feeding trial sunflower silage compared very unfavorably with corn silage. However, the drop in milk-flow when the cows were changed from the mixed corn and sunflower silage to clear corn silage would indicate that the mixture may be preferable to straight corn silage and work along this line will be continued during the coming season.—Quar. Bul. M. A. C.

MORE THAN ONE DIPPING NEEDED TO FREE SHEEP FROM SCAB

A single dipping usually fails to rid a flock of sheep from scab, according to findings by specialists of the United States Department of Agriculture.

The apparent reason is either that all the females in the course of depositing eggs at which time they appear especially tenacious of life, or all the eggs already deposited have not been destroyed by the dipping; consequently, after the eggs which may have escaped the first dipping have had an opportunity to complete their incubation, it is essential to dip the sheep again.

It is also essential that the second dipping take place before any mites which may hatch out after the first dipping have had time to become mature and deposit more eggs. As the eggs on the body of the host usually require 4 days' incubation, sometimes a week, and probably never more than ten days, and as ten to twelve days are necessary for the young mites after hatching to grow to maturity, mate, and deposit their eggs, it would appear that the best time for the second dipping is about ten days after the first, as all the eggs will have hatched, while practically none of the new generation of mites will have developed sufficiently to deposit eggs. Practical experience has shown that the second dipping may be delayed until the fourteenth day without unfavorably affecting the results of the treatment, but wherever possible it is preferable to follow the ten-day rule.

EQUINE HEMORRHAGIC SEPTICEMIA

While many articles have appeared in veterinary journals from time to time upon hemorrhagic septicemia in cattle, sheep and swine, I recall reading only one article treating of this disease in the horse, and in that one, as I recollect, the symptoms were far different from the symptoms in the cases that I have observed.

On February 3rd, 1919, I received a call to a neighboring town to see a sick mule.

Upon arrival I found a nice large 8-year old mule, weighing about 1,400 pounds, 16 hands high, loose in a large shed opening into a yard where there were a number of horses and mules.

The patient was mincing away at some oats in the feed box as I entered the shed, and as another mule passed him he brayed in a perfectly normal manner as though nothing was wrong with him.

Upon examination I found a slight watery discharge from the eyes and nose; a few petechial spots on the mucous membrane of the nose and an occasional drop of blood in the discharge.

The owner asked me what was wrong with him. I was just about to say that he had a mild case of "purpura hemorrhagica", when he interrupted me by saying that he had lost two mules and a horse a day or two before and, the symptoms being just like the mule showed, that this mule would be dead by morning. I did not think he would, although I did not say so. This was about 4:00 p. m. Sunday, and at 7:00 a. m. Monday, he called me by 'phone saying that the mule was dead.

I went out and held an autopsy and my findings were as follows:

After the skin had been removed, the animal looked as though it had been dead for several days, decomposition having taken place so rapidly. The back and sides were blackish green, there were some hemorrhagic spots upon the flexor tendons of the hind legs, and there was some blood

around the nostrils. Upon opening the abdominal cavity, nothing unusual was seen except a number of hemorrhagic spots on the muscular bands of the large intestines and upon the diaphragm.

Upon opening the thoracic cavity, it presented the most beautiful shades of red, from a dark rose color to the nicest pink you ever saw. The thoracic walls were a dark red and shaded off into a light pink. The lungs were normal except that they were covered with bright red spots. The lobes of the heart were also spotted as was the tendinous portion of the diaphragm.

I suspected it was hemorrhagic septicemia, as I had seen exactly the same lesions in sheep that I had posted, and I so informed the owner.

I took a couple of samples of blood and sent them to two different laboratories and they both confirmed my diagnosis. At the same time, I telegraphed for equine hemorrhagic septicemia bacterins, as there were seventeen more horses and mules in the same lot.

The next day another mule was taken sick with symptoms about the same as No. 1 except that it did not lie down at all after it was first noticed to be ailing.

I gave this mule 45 gr. of sodium cacodylate hypodermically. It lived about forty-eight hours.

Postmortem revealed the same symptoms with one exception—the lungs were very dark, hepatization having taken place.

On the eighth, I gave each animal a dose of bacterins and repeated again in three and five days. The bedding was burned and sheds and yard thoroughly disinfected with a 5 per cent cresol solution. This disinfection was repeated in a few days.

No more animals in this lot became sick. It is now about sixteen months since, and horses and mules have been kept in the same enclosure nearly ever since.

Three More Cases

January 2, 1920, I was called to see three horses that the owner said had taken sick the day before. When I arrived, one was dead, one was standing in an adjoining stall, and the third was lying down. I noticed a discharge of blood from the nostrils of the dead horse. All the information I could get from the owner was that they refused all food and water.

Horse No. 2 had a mucous discharge from the nose and eyes, some small petechial spots on the schneiderian membrane, quick weak pulse, temperature 105°, respiration slightly accelerated. It died the same day.

The horse that was lying down was forced to get up. There was a discharge from the nose and eyes, which was streaked with blood. Pulse was quickened, temperature 104.4°, bowels constipated, and the animal seemed very weak. He urinated and streaks of blood appeared in the urine. Following urination, he lay down and did not get up again. This horse died early the next morning.

Postmortem findings corresponded with mules No. 1 and 2.

I sent samples of blood to a laboratory and my diagnosis was confirmed.

We have had several more just such cases during the past year. This is a very unusual disease among horses and mules in Ohio, but perhaps some of our western friends may have seen many just such cases and can give us a report in some future issue.

Norwalk, Ohio. H. FULSTOW.

SUGGESTIONS FOR HANDLING TETANUS

Inject 5,000 to 10,000 units of tetanus serum intravenously, then 1,500 to 3,000 units a day subcutaneously, tablin sulph 1/10 less. Hypo injections two to three times a day passaforalnata in 1-oz. doses every hour, or both, if needed. Also, use ether per rectum as outlined in Mart Steffens' "Veterinary Clinical Notes."

Note 109. Under this plan I have been able to keep a relaxation of the tetanized muscles. I also find that the bowels move once after its use. And as Veterinary Clinical Notes doubt the practicability of the ether treatment, will say that after many trials will say that it is a success in my hands. When down or unable to stand, I find that under the above treatment that if I can keep them alive for 36 hours from the time I get to them, I do not consider them hopeless.

I have had fourteen bad cases in three or four years, and have lost four in all. The time of recovery was from three to four weeks.

I used 24,000 units of serum on one case

—also 10 lbs. ether—also 2 lbs. passiflora, before I got results and also a liberal fee, as this case had been given up by another practitioner. For detailed information as to the ether treatment refer to Mart Steffens' "Veterinary Clinical Notes."

W. I. PAGE.

Blue Springs, Neb.

RECOVERY FROM AN ENORMOUS PUNCTURE WOUND

I recently removed a fence-post four inches in diameter from a mare. It had entered the pectoral muscles, internal to the left elbow, and made its exit just anterior to the external angle of the ilium, after traversing the subcutaneous tissues for a distance of three feet, six inches. She has made a nice recovery.

The Plains, Va. REG. VICKERS.

DISASTROUS RESULTS FOLLOW BOLD CUTTING IN OBSTETRIC CASE*

I was called to see a three-year-old Jersey cow that had been in labor two days. The uterus was protruding as in the foregoing case. My treatment was without benefit. Three days later a gelder was at the place castrating colts, and offered to remove the calf by cutting. With the owner's consent he delivered the animal of a dead calf in a few minutes.

The uterus did not return of its own accord and was not replaced. Four weeks later I learned from the owner that the cow was nearly rotten. Twelve months later she had a tumor about the size of a water bucket that looked like a rose and was destroyed.

B. L. TERRELL.

Dresden, Tenn.

PROLONGED LABOR WITH VIOLENT ENDING*

I was called to see a five-year-old shorthorn cow that had been in labor three days. The uterus was protruding about twelve inches and was about the size of a man's head, very hard, and the os was so tightly closed I could not force my fingers into it. I was unable to dilate the os or to replace the uterus.

The next day the parts returned to their normal positions while the animal was standing. There was no change in the os. The animal was eating as though nothing was wrong. I left her and she remained all right until the seventh day of labor. While lying down, the parts would protrude about as when I first saw them. When I called on the seventh day, the owner stated that the cow had been acting crazy for about four hours and had fallen down among some small stumps and torn a hole in the uterus between her body and the "knot" as he called it, and had delivered a dead calf. I found the uterus torn about ten inches across. I removed the placenta, washed the parts in permannagate of potash, returned the uterus, and the cow got up and walked to shelter.

There was a discharge for a month, but the cow recovered and gave milk for about two years, but was never bred again.

B. L. TERRELL.

Dresden, Tenn.

LATE LOCAL REACTION TO INTRADERMAL TEST*

Most frequently positive local reactions can be observed at 36 or 48 hours after the injection of tuberculin, but a constant, though very small, percentage of cases will not show definite reactions until later. On several occasions during the past five years, there appeared instances where a large percentage of reacting animals failed to show definite reactions at 36 or 48 hours, but showed such later. An intradermal test applied to 45 cattle in April, 1919, at the end of 48 hours showed two definite reactors, five cattle with slight but observable thickenings, and two with indurations not larger than B. B. shots. At 96 hours, not only did these nine animals show definite positive reactions, but eight other animals which had shown no appreciable thickening at 48 hours, gave well defined reactions. No explanation is offered for such results, which are not the rule but, nevertheless, occur occasionally. They emphasize that early examinations alone can not be depended upon to give correct results. Two observations are recommended, the first at 48 to 60 hours, and the second at 96 or 120 hours.

*Read before the Tennessee Veterinary Medical Association.

T. H. Williams, in Jour. Dept. Agric., South Australia, Adelaide, Vol. 22, No. 12.

REPRODUCTION AT A VERY TENDER AGE

A Jersey heifer calf belonging to one of my clients, Mr. John T. Shirley, of Luray, Virginia, so far as my experience goes, recently made a record for the bovine in early reproduction. The calf is a pure-bred Jersey, born May 6, 1919, and was bred during August of the same year to a pure-bred Holstein calf about six months old. This heifer delivered, without assistance, a well developed calf on May 19, 1920. It was then one year and thirteen days old. When last seen, the mother and offspring were doing well.

Luray, Va. L. K. SPITLER, D.V.S.

VETERINARY RESEARCH

There is scarcely a department of veterinary science that does not require overhauling and placing on a newer basis, especially in this country, where attention is bestowed only on those matters of immediate utilitarian importance, or, in other words, bring in immediate returns. In consequence of this, those outside the veterinary profession, who take a much wider view of its importance to other branches of science, such as medicine and agriculture, are bestirring themselves to fill up those lacunæ which we had not even thought about, let alone attempted to fill up.

As the world becomes more and more highly civilized, and more and more populous, especially if the promises and hopes that wars shall be longer interspaced by peace become realized, there will necessarily be a greater demand for animal food, such as meat, fat and milk, to say nothing of clothing derived from animal products.

Without healthy stock there would be a scarcity of animal products for the sustenance of mankind to such a degree that a greater number of inhabitants would be decimated from such a cause than from disease. Therefore, unless great vigilance be observed and maintained, epizootic diseases in these days of quick and in future days of quicker transit from one part of the globe to the other, will be liable to spread with greater rapidity than formerly, and hence destroy the animal population so as to decrease the food supply to a point of impoverishing the nutrition of mankind, if it does not destroy it, at least, the less vigorous, by acute starvation. Consequently, to obviate this threatened disaster to man, it behooves the disciples of veterinary science to raise their vocation to a higher plane than it has hitherto obtained. It is no stretch of the imagination when we say that veterinary science will become of more and more importance as time goes on, both nationally and internationally. It must, therefore, keep pace with engineering science, and also with the rapid progress of civilization, which imposes upon us fresh obligations at each step of progress.

As the basal welfare of mankind depends absolutely upon the supply of nutrition derived from the animal and vegetable kingdoms, it is up to the agriculturalist, of whatever branch of agriculture to which he devotes his attention, to create the supply of biological products in such an abundance as to equal the demand. It is the function of the veterinary profession to see that the health of all the economic animals is conserved in order that they may be so numerous as to satisfy all the demands of man with a sufficiency of their products for his well being.—Editorial in *The Veterinary News*, London.

POST-PHARYNGEAL SURGERY*

I have been familiar with the condition known as "snoring" in cattle all my life, and have had a wide experience in treating this affection.

My mode of procedure is to catch the animal's tongue in the left hand with a cloth and pull it well out, when the right hand and arm can be safely passed down the throat and a manual exploration made. Before doing this, it is wise to get two strong men to hold the cow, the one on the left side passing his right hand between the horns, catching the nose, and grasping the tip of the left horn with his left hand, and placing his back against the cow's shoulders. The man on the right side in a similar position holds the right horn, it being impressed on both men the absolute necessity of keeping the beast's head

*The Veterinary Journal, Vol. 76, No. 2.

straight and the muzzle elevated. If the abscess is ready to be opened, I generally open it with the finger nail; to insure that it will not heal too rapidly I make a large, jagged opening. If the finger nail is not able to effect an opening, I use a concealed knife carefully attached to the wrist by a piece of tape. Should the abscess not be in a condition for opening, I apply a sharp blister all around the throat and call again a week later.

These abscesses are nearly always tuberculous, and there is a probability of their recurring. In most cases immediate relief is given to the patient, but there is always the risk of the owner or attendant becoming alarmed twenty-four or forty-eight hours afterwards and sending again for the practitioner. This summons may be disregarded, as the condition arises from the wound made in the throat, and the trouble subsides in a short time. With two fairly handy attendants it is quite possible to operate on an animal of any size without casting or chloroforming, and the risk of choking is very slight, if it exists at all, since the hand and arm may be withdrawn immediately on any sign of choking. It is, of course, impossible in small animals to get the hand and arm down the throat, and in these one must use a gag and open the abscess with a long knife, but I find from experience that this condition is rare in young animals.

In the last thirty-four years, I must have operated on some thousands of these cases, and the result has been favorable in 99 per cent of them.

Polypi Removed in the Same Manner

I have also encountered two or three cases of polypi, most of them being enclosed in the abscess and surrounded by pus. They are easily dealt with by snaring them with a piece of strong string and cutting them off with a concealed knife.

Some twenty years ago I had a disagreeable accident when operating on this latter condition in a small Kerry cow. One of the attendants released his hold and the cow, twisting her head around and getting the first molar a half inch into my wrist, severed the nerve supplying the thumb and first finger. I was, however, able to remove the tumor successfully six weeks afterward, but for some months had to wear a pad to protect the scar resulting from the rejoining of the nerve-endings, and I got a slight electric shock when anything touched it.

The manual dexterity needed for these operations is acquired by practice; and the only thing one has to be careful about is not to allow the hand to remain any length of time in the neighborhood of the molars, either when inserting or withdrawing it, as the animal will very easily push the hand aside with the tongue and get it between the teeth if allowed to do so. I have had only this one accident in thousands of cases, and I think my experience might be of some benefit to my brother practitioners.

E. C. WINTER, F. R. C. V. S.
Limerick, Ireland.

RECURRENT ATTACKS OF AZOTURIA

I received the following history from the owner of the animal, a Percheron mare, five years old, weighing 1,300 pounds. I have not seen the case myself.

December 1, 1919. The mare had been standing for two days, and after being driven for about a quarter of a mile, became stiff in both forelegs.

January 3, 1920. After standing in the barn for two days, she was driven two miles and became stiff as before. After resting two hours all stiffness disappeared. She was then driven about three miles and became stiff again, the attack lasting four hours.

February 1, 1920. After standing a day, the mare was driven a quarter of a mile and became stiff again, the attack lasting an entire day.

March 4, 1920. After standing a week, she was driven a quarter of a mile and became stiff again. At present she is improving, though still somewhat stiff. The owner stated that during the first attack, the urine passed was dark as in azoturia; there was no discoloration during subsequent attacks. The bowels are apparently normal and the appetite good.

The owner states that during each attack the mare dragged her forefeet both in going forward and in backing. There were swellings in both shoulders as near as I could determine, in the posteus spinatus muscles. Between attacks, her move-

ments while at work are quite normal and the mare appears to be in good health.

I would be pleased to have some information regarding this case.—*J. L. S.*, Canada.

SEPTICEMIA OR FORAGE POISONING

My first case of so-called forage poisoning occurred in 1901 in a sixteen-year-old dapple gray mare, weighing 1,480 pounds. Fourteen days before this mare was taken sick, she had been driven about thirty miles. She was free and speedy for a mare of her light weight and could go ten miles an hour without much exertion.

A day or two after the drive, the mare had what I took to be a slight cold, but later I knew it was an attack of influenza. I paid little attention to the cold and in a day or two it passed off leaving her apparently well. She never stopped work, but ate a little less for a few days, her normal appetite returning in about a week.

Seven days later, she was driven in from pasture as usual, fed, and after breakfast hitched up and sent to the field to work. When first taken out of the stable, she ran a short distance, then went back to the stable and looked in—seemed excited. She was caught and no further attention given the occurrence. However, the driver afterward told me the mare had a nervous, worried look as though something had frightened her, but on going back to investigate, he saw nothing to cause her fright. The animal was unhitched at noon, apparently well, and was watered and fed. On coming out of the stable, she reeled but immediately righted herself. Thinking she might have stepped on something that caused her to stagger, no further attention was given to the matter, and she was hitched up.

When she had gone about three hundred yards, she went lame in the right fore leg. She made an attempt to urinate, but failed. In a moment, she began to reel, hind parts to left, front quarter to right, so she was unhitched. In a little while, she recovered and walked all right.

I took off the harness, examining the collar to see if she was chocked down. Examination showed the stomach empty, large colon packed; peristalsis absent; pulse weak; respiration almost normal; pulse about twenty beats faster than normal, and weak. No fever noticeable. The mouth was pale yellow; tongue sticky and clammy; mucous membranes of eye congested. The eyes had a peculiar, faraway look; pupils a little dilated followed by contraction. Percussion over the liver caused some pain. The urine was scanty; the feces a little softer than common. The excitement was of short duration. When circling, the mare would turn to the right. The cardiac movement was more noticeable on the right side than on the left. Externally, she had no feeling and took no notice when pricked with a pin.

I gave her a pint of lard and a tablespoonful of turpentine and left her alone for awhile. She went into the stable and on coming out, fell. Regaining her feet, she walked through two wire fences before I caught her. At times, she was unconscious but rallied and I took her out in a field by a wheat stack and left her. She fell on her back and never regained her feet. She died during the night.

Some observers contended that this was a case of forage poisoning, but in my opinion, it was not.

Hugoton, Kans. F. F. DURBIN.

SODIUM CACODYLATE AND QUIET COUNTERACT SHOCK

I was called to see a cow that had been sick for about four days. She was about eight years old and had calved four months previous to my visit. She was nervous, excitable and walked with a stiff, irregular, uncontrollable gait. When it was necessary for her to step over some object lying in her path, she went through the motions of stepping over it before she reached it. She was so nervous that she would almost jump over the manger if anyone approached her. Her temperature was normal, but respiration was rapid. Another veterinarian had said that the only trouble with the cow was that she had mud on her feet or dirt between her toes, but the owner would not accept this diagnosis.

My tentative diagnosis was that the cow had sustained some severe shock to the central nervous system by some injury, as I could not connect the symptoms with any disease.

I gave her sodium cacodylate with in-

structions to put her in a dark stall and keep her quiet for ten days, her food and water to be carried to her. I recommended that she be fed on bran mashes or scalded oats.

JAMES N. HORN.

Gibson City, Ill.

WORK WITH ANIMAL PARASITES

In the treatment of stomach worms in sheep a 1 per cent solution of copper sulphate at the rate of 50 cc. for lambs under 1 year of age and 100 cc. for adults was used and repeated after 3 or 4 days with fairly good results. Treatment with copper sulphate and tobacco resulted in 95 to 99 per cent efficiency in removing stomach worms, 75 to 100 per cent for tapeworms, and 100 per cent for hookworms in experimental lambs.—L. L. Lewis, Oklahoma Station Report, 1919.

DISPENSING

Many veterinarians still adhere to the old-fashioned custom of putting their medicines in pint and quart bottles, or even larger ones. This is not necessary, nor does it give a very good impression. For all general purposes, with a few exceptions, a twelve-ounce mixture should be the limit. In my practice, I use three sizes of bottles, four, eight, and twelve ounce.

As for the directions or the method of giving the medicine contained in the bottle, I try to get away from drenching entirely and either order the medicine given on the feed, if the horse eats well, or show the client how to use the dose syringe.

In the case of cows, of course the easiest and most practical way to administer liquids is in the form of drenches.

Applications for external use can frequently be so prepared that they may be applied with a brush. This method of applying a preparation always is novel and appealing to the client, as well as cleanly and also saving.

When powders are dispensed it is best to wrap each dose in a separate piece of paper, so that your directions may read "one powder every such and such time." This is troublesome and takes time when one is busy, but it pays.

I have made it a rule never to entrust attendants or owners, even though they seem quite intelligent, with the giving of capsules to horses. In my opinion it is one of the things that breeds local or district quackery.

Neither do I permit the use of injections into deep tissues by owners or attendants. For this there are a dozen reasons; reasons which all good veterinarians readily recognize.

Mart R. Steffen.

Allenton, Wis.

THERAPEUTIC SUGGESTIONS

Do you know that sodium sulphate given in liberal doses, one to four ounces according to age and weight of a pig, is a safe and sure method of removing worms from swine? It should be repeated in about two weeks. Give enough to insure free catharsis.

Castor oil, without admixture with any other drug, thoroughly rubbed in, has proved most efficient in the treatment of demodectic (follicular or red) mange. The hair of the infected animal should be closely clipped and a thorough scrubbing with green soap should precede the application of the oil.

A treatment for sarcoptic mange and which is also highly efficient in some other parasitic skin diseases, consists of the following mixture:

Crude oil (Beaumont preferred or Kansas crude) ..... 1 pint
Oil of tar ..... 1 pint
Liquid petrolatum or neutral oil, to make 1 gallon.

This to be thoroughly rubbed in after first thoroughly scrubbing the affected area with green soap and allowing to dry. Repeat in about five or six days.

In the treatment of ringworm in animals, do not waste yours and the owner's time by applying tincture of iodin. The official mercurial ointment is very much more efficient. It should be thoroughly rubbed into the parts affected, once daily, until the signs of the infection disappear.

Chicago, Ill. E. L. QUITMAN.